

THE DOCK & HARBOUR AUTHORITY

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Editorial Comments.

DOCK AND HARBOUR AUTHORITIES' ASSOCIATION.

This Association held their annual meeting at the Caxton Hall, Westminster, on Wednesday, February 20th, and the annual report for the year ending December 31st, 1928, was presented and adopted, and is given in detail on another page of this issue.

The chief topic of discussion was the Government's de-rating scheme, in which the Association consider that the advancement of the reductions by nine months in the case of the railways would injure other forms of transport.

Mr. Richard Holt, chairman of the Mersey Docks and Harbour Board, said that, while he would not enter into a political discussion on the Government's de-rating proposals, he wished to record his strong opinion that if any Government wished to help trade, particularly with reference to docks and harbours, they could do it better by prudent management of public finance and the redemption of the National Debt, which would bring down the rate of interest, than by anything else. The petrol tax, on which the scheme of relief was based, would certainly be injurious to some traders. Money thus raised by direct taxation would penalise prosperous trades for the benefit of the unprosperous. He did not see any answer to the claim that the coastwise trade was being unfairly treated by the advance reductions to the railways. Unfortunately it very often happened that, when a person's trade was taken from him unfairly, it was not easy to get it back again.

The Chairman (Alderman Edward M. Dyer, of Bristol) pointed out that the Association represented 71 per cent. of the tonnage of the United Kingdom. He said that he did not like the de-rating scheme, because it meant taking £21,000,000 from one pocket and putting it in another. It might help some trades, but the cost would have to be made up by others. The nine months' advantage given to the railways was manifestly unfair, because it would enable them to take away the trade of other transport undertakings. The railways were out to kill every other form of transport that they could. They were out to kill the canals, the coastwise trade, and road transport. He knew it was difficult at the present time for other undertakings to point to any serious loss, because this would not be felt for some time. He could, however, assure the members of the Association that the railways were very active at the present time in trying to get traders to send everything by the railways. The trader himself was very often to blame. He frequently obtained a low quotation from a coastwise transport organisation, and then went to the railway companies, who agreed to take the goods at the same or at a lower figure. Some day the traders would find that the waterways could not carry on, and that the railways had obtained a monopoly of transport. They would then realise the mistake they had made in assisting them to get that monopoly.

Referring to the Association's memorial that dock authorities should receive a grant-in-aid from the Exchequer, such as was conceded to the general police forces of the country, in respect of the cost of policing their undertakings, the Chairman said that the present position was very unfair indeed. He thought that the time had come when they should receive some relief in that respect. In conclusion, he said that the past year had been one of the happiest in their relations with labour. Workers were becoming more reasonable, and some leaders had assured him that they would avoid many differences if dock authorities would only hand on to their officials information of promises they had made to the men.

Sir William Raeburn, chairman of the Clyde Navigation Trust, in proposing a vote of thanks to the committee and the staff, said that he could not agree with the criticisms of the de-rating scheme. He was grateful for the de-rating scheme which had been so much maligned. The dock authorities in Glasgow welcomed it. The benefits, he thought, would in the end filter through to all concerned. The docks were asked to help the shipowners, and they had helped

them, but shipowners were not always grateful. Docks in this country were managed with the greatest possible economy, and their dues, while not comparing with those on the Continent, were down to as low a point as they could be brought consistent with the maintenance of efficiency. Continental ports had cheaper wages and longer hours than those in Britain, and the former very often had Government or municipal assistance to fall back on in times of difficulty.

Mr. W. C. Bacon, chairman of the Manchester Ship Canal Company, was elected president, and the following were elected vice-presidents:—Lord Ritchie of Dundee (London), Sir William Crundall (Dover), and Messrs. R. E. Herdman (Belfast), B. L. Nairn (Dundee), and P. J. Lawrence (Dublin). Mr. T. P. O'Connor, M.P., was re-appointed Parliamentary chairman of the association, and the following nominations to the executive committee were confirmed:—Sir John H. Irvin, Messrs. F. Samuelson, D. J. Owen, T. A. Peace, H. B. Gordon Warren, E. Latimer, G. W. Service, M. J. Watkins, and W. Hewat.

PERMIT FOR VEHICULAR BRIDGE OVER MISSISSIPPI RIVER AT NEW ORLEANS.

At a special meeting on January 29th, the Board of Commissioners of the Port of New Orleans authorised General Manager Marcel Garsaud to sign and issue to Messrs. George A. Hero and Allen S. Hackett a permit for the construction of a vehicular bridge across the Mississippi River at New Orleans, the east bank end to be situated in the vicinity of Race Street, which is approximately midway of the river front development of the port. Ample conditions have been imposed and agreed upon, in the opinion of the Board, to protect the commerce and shipping of the port, and to prevent any possibility that the bridge might at any time offer menace or obstruction to navigation. Under the terms of the permit, work will be required to begin not later than January 1st, 1930, and to be completed within three years of that date, under penalty of forfeiting the permit in case of failure to complete within the specified period.

This bridge is to be approached by spiral ramps at either end, and, under the terms of the permit as applied for, will have a clearance of 160-ft. at the centre, of 152-ft. at points 375-ft. from the centre in either direction, and of 135-ft. at the wharf line, the total span being 1,640-ft. from the pier on the east bank to that on the west. Authorisation by the chief of engineers, U.S. Army, must be obtained before the bridge may be built.

THE PANAMA CANAL AND ITS PORTS.

The strip of waterway which virtually divides South and North America, and which is known as the Panama Canal, together with its ports, forms the subject matter for this month's Supplement.

The cutting of this canal, which was commenced in 1905, took 9 years to complete and was open to commercial vessels in August, 1914.

The total length of the canal is 43.85 nautical miles, and the limited depth at mean low tide is 35-ft., and contains a series of three locks which are known as the Gatun Locks, the San Pedro Miguel Locks, and the Miraflores Locks.

Entry to the canal zone is in both cases through a port, that on the Atlantic side being the port of Cristobal, and on the Pacific side being the port of Balboa. The commerce of the canal has shown a remarkable increase since 1922, the figures for that year being 10,884,830 tons, and in 1926 had risen to 26,087,447 tons; the earlier increase being mainly due to the large shipments of oil from the Pacific Coast to the Atlantic Coast of the United States.

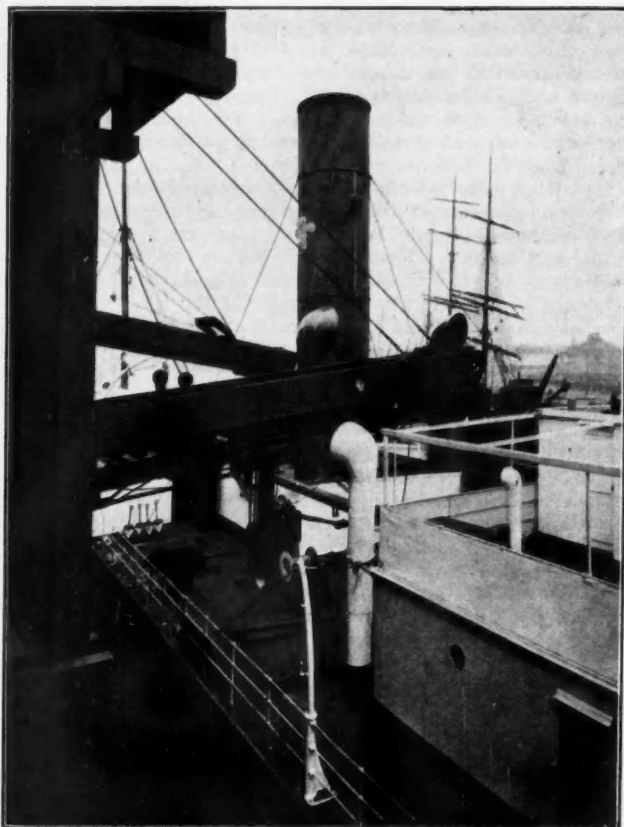
The cutting of this canal has meant a great saving to ships as previously traffic had to undertake the journey round the Horn, and it can be readily seen that the Panama Canal means a great saving in time and finance.

An illustrated article on the Panama Canal and its ports is given in full detail on another page.

Tyne Dock.

Tyne Dock, shown in the accompanying photograph, is one of the chief coal shipping places on the River Tyne, and has in addition a very considerable import trade. It is the property of the London and North-Eastern Railway Company and serves as an outlet to many of the principal collieries in Durham, although the Railway Company's construction of the staiths at Dunston and West Dunston has tended to divert some of the trade coming from the western section of the county.

Fuel shipments are consistently heavy, and during last year reached the good total of 2,562,647 tons, 77,517 tons being coke. These figures are far below the 1923 total, when the huge total shipment of 6,581,511 tons was recorded, which really affords a clear indication of the capabilities of the dock when trade is adequate really to test them. At the same time it may be noted that the shipments for 1928 exceeded the preceding year by 341,671 tons, were double those of 1926, and only about 20,000 tons below the figure of 1925. The record week's shipment last year was 102,167 tons returned for the week ended December 15th.



Coaling Belts, Tyne Dock, L.N.E.R.

The chief imports are timber, wood pulp, iron ore and grain, and the figures for 1928 were: timber, 179,000 loads; wood pulp, 23,000 tons; iron ore, 383,000 tons; and grain, 16,000 tons. Here again, if trade was more brisk, very much larger quantities could easily be handled by the appliances with which the dock is equipped.

That trade has shown some improvement since 1929 has come in is proved by the fact that in the middle of January a thousand men were engaged at Tyne Dock, and there is not only hope, but expectation that, as trade expands, the number will be largely increased.

There are two circumstances which give promise of more trade at the dock. The first is that, in order to achieve quick clearances of tonnage, a scheme has been devised by the London and North-Eastern Railway Co. under which, when there is an excessive amount of shipping at Dunston waiting for coal cargoes, these are diverted to Tyne Dock and a rebate allowed on the increased transport charges. The other factor making for shipments is the agreement by the trimmers and teamers to work until late on Saturday night should that enable vessels to leave the same night instead of having to wait until the Monday.

SEED POTATOES FOR WESTERN FARMERS.

A shipment of unusual character discharged at New Orleans the first week of January was 6,000 sacks of seed potatoes, brought by the ss. "Nidar" from Georgetown, Prince Edward Island, and delivered at the Westwego wharves to the Texas and Pacific Railroad for movement to western points.

North-East Coast Notes.

The trade outlook on the North-East Coast is better than it was a month ago, and while it is necessary to be cautious and to avoid exaggerated optimism, the position in the coal trade gives hope of better things. Coal forms the keystone of trade in this area, and the steady expansion of the exports of fuel is the best augury for the future.

Complaints have been loud and insistent of a dearth of coal at the ports, especially the Tyne and in Wales; but the steady increase in shipments in this area show that, while there have been instances of delay of tonnage, they have not been due to inadequate facilities at the shipping places. Complaints were made in Parliament in the early days of February as to demurrage of vessels due to shortage of fuel, but there was no suggestion that there was any other cause for this delay. The pressure at the staiths was very considerable, which is illustrated by the fact that on the day when the complaint was made in the Commons, the figures of Tyne coal shipments for the previous week were issued, and showed that the total output from the river had been 384,550 tons, which was no less than 78,440 tons above the figure for 1928. Shipments proceeded steadily and regularly, and had there been more coal to hand, more could easily have been disposed of. The developments and improvements which have recently been made to facilitate coal shipments proved their worth, and work everywhere proceeded without a hitch.

JARROW DEVELOPMENT.

The Ministry of Transport has granted the order sought for the construction of a light railway at the east end of Jarrow, and it has given much satisfaction, for it will lead to very considerable industrial expansion on what is known as the east end estate and will also facilitate any extension scheme the Tyne Improvement Commission may inaugurate in respect to Jarrow Slake. The line will be connected with the London and North-Eastern Railway line between Newcastle and South Shields. The scheme was the proposal of the Mercantile Dry Dock Company, who are owners of the estate, and although there have been many difficulties in the way, these have now been overcome and an early start is to be made with the work. The railway will serve the large oil stations of the Shell Mex and British Petroleum Oil Companies and the Mercantile Dry Dock Co., etc., and will now enable the Shell Mex Co. to proceed with their scheme to provide additional tank accommodation. In addition to opening out a large area of land suitable for industrial purposes, the London and North-Eastern Railway Company have purchased a site for the goods station.

The question of additional dock facilities on the River Tees is likely to take a definite shape in the near future. The Tees Conservancy Commissioners recently had under consideration the question of further developments on the north bank of the river by the Synthetic Ammonia Nitrates, Ltd. These include new works and a wet dock to meet the company's increasing export trade.

Colonel G. P. Pollitt, deputy-chairman of the Imperial Chemical Industries, Ltd., speaking recently to members of Middlesbrough Chamber of Commerce, dealt with the development of the heavy chemical industry at Billingham on the north bank of the Tees, and stressed the need for additional and better rail and dock facilities. Sir Hugh Bell mentioned that the scheme for a dock on the south side of the river had been abandoned, but they were now faced with a proposition of greater magnitude, the figures of which were extremely large, and he hoped a satisfactory solution would be found. The developments at Billingham, as outlined by Colonel Pollitt, are to cost £20,000,000 by the time they are completed, about the middle of next year. He added that they were producing at Billingham 1,100 tons of products per day, and by the end of 1929 they would have increased their capacity to two and a half times these quantities, and should have a daily output of nearly 2,500 tons of main products or more than 800,000 tons per year. Practically the whole of this would be shipped abroad.

SMART WORK IN THE NORTH.

Two interesting instances of smart work are recorded. The first to be reported was that of the steamer "Krivs," which discharged an average of 284 standards of pit props per day at Blyth, and in 13 working hours discharged her whole cargo of 461 standards. The other was a somewhat remarkable bunkering feat at Tyne Dock. The Norwegian steamer "Maisol," laden with wood pulp and bound from Sweden to London, met with such severe weather in the North Sea that her supply of bunkers became exhausted. She succeeded in reaching the Tyne, and arrangements were made for a quick supply of bunker coals. Entering Tyne Dock immediately after the gates opened, she took in 40 tons of bunkers, sailing again in a little more than an hour, the bunkering having occupied only ten minutes!

Tyne Dock.



Tyne Dock, L.N.E.R.



Loading Coal from Nos. 5 and 4 Coaling Jetties, Tyne Dock, L.N.E.R.

Irish Harbour Matters.

NEW STEAMER FOR CORK SERVICE.

A high-class twin-screw passenger and cargo motor ship for their Cork—Fishguard service is to be built for the City of Cork Steampacket Co., Ltd., in the Belfast yard of Messrs. Harland and Wolff, Ltd. This vessel will, in many respects, be similar to the three new passenger motor ships at present being built by Messrs. Harland and Wolff for the Belfast Steamship Co., Ltd., which is also part of the Coast Lines organisation. The fleet of the City of Cork Steampacket Co. now consists of seven steamers, the largest of which is the "Kenmore," built by the Ardrossan Shipbuilding Co. in 1921.

DUNDALK HARBOUR IMPROVEMENT.

The Dundalk Harbour improvement scheme, which aims at the acquisition of all private quays at Dundalk and their improvement, as well as the erection of additional berthage facilities, seems now in a fair way of going through. Mr. Hewson, the Government arbitrator, has published his award following the arbitration held some months ago into the claims for the acquiring of the quays. The total claims amounted to £40,678, and the arbitrator awarded £7,961.

Messrs. Kelly and Co., who owned Browns and Oakes quays, have been awarded £6,661; Messrs. Williamson, £540, plus £760 to the Dundalk and Newry Steampacket Co., for the redemption of the rent paid them; and Messrs. O'Rourke and Co., £400.

PILOTAGE CHARGES ON AMERICAN LINES.

The total revenue received by the Pilotage Committee of the Cork Harbour Commissioners for the year ended 30th June last was £16,060, of which the American liners contributed £8,167 or 51 per cent. This statement was made at a meeting of the Pilotage Committee, which met representatives of trans-Atlantic steamship companies to discuss pilotage charges on liners calling at Cobh (Queenstown).

The six liner companies objected to the confirmation by the Free State Ministry of Industry and Commerce of the committee's decision to exclude their vessels from the reduced pilotage charges which are being proposed. At present a flat rate of £20 pilotage dues is charged on all liners calling at Cobh, whether east or west-bound. In the case of a vessel due to call but prevented from doing so, a pilotage charge of £10 is leviable. Tonnage dues on only one visit are charged on vessels calling on the outward and homeward journeys. These amount approximately to £20.

The companies considered that the amount they pay at present: £20 per steamer on both east and west-bound calls; £10 for ships that fail to call when due; and in the case of three lines, £5 additional per call for boarding the pilot—was excessive in view of the services rendered. The companies contended that any reduction in these charges would tend to increase the number of calls by liners and so improve the tourist traffic.

Against this argument the Harbour Board contended that the liners were getting preferential rates, and that if the ordinary rates levied on freighters were charged on liners the amounts would be substantially higher.

It was finally agreed by 5 votes to 2, on the motion of Mr. Mercier, to recommend the adoption by the Harbour Board of a flat rate of £15 for liners, the boarding charge of £5 to stand for the three companies it affected.

The liner representatives agreed to the proposal, the companies represented being: Cunard Line, Mr. T. C. Brierton; Canadian Pacific, Mr. J. Hogan; Hamburg Amerika, Mr. J. M. Kenney; North German Lloyd, Mr. W. S. Mitchell; United States, Mr. F. Carroll; White Star, Mr. W. R. Harman.

RATES REDUCED: PILOTS' PROPOSALS ADOPTED.

At a meeting of the Cork Harbour Commissioners, held for the purpose of considering the Pilotage Committee's recommendations regarding charges on American liners, viz.:—

- (a) A flat rate of £15 per call.
- (b) A rate of £7 10s. for every occasion on which a liner, bound for the port, passed without calling.
- (c) The minimum monthly payment to be reduced to £20.
- (d) The boarding fee of £5 to stand.

A deputation from the harbour pilots protested against such a reduction, contending that their means of livelihood would be taken from them to the extent of 50 per cent.

The liner companies wanted a £5 reduction, and the pilots were prepared to meet them half-way. The pilots asked for a minimum figure of £17 10s. per ship, which, their spokesman remarked, was less than the steerage fare to America. The pilots also would agree to a reduction of £2 10s. for boarding.

The Commissioners decided, on the motion of Mr. A. C. Horne, seconded by Captain O'Regan, to amend the Pilotage Committee's scales in order to meet the pilots' proposals.

Mr. Horne pointed out that last year 374 liners called at Queenstown, and the proposed reduction of £5 per vessel meant a loss of £1,870 to the Pilotage Fund. The amendment represented 374 liners at £2 10s., which would equal £935, and of

the ships which were boarded, the reduction of £2 10s. represented £290, making a total of £1,225. That, deducted from £1,870, left £645; that was to say, instead of taking £1,870 of the pilots' money and handing it over to the liners, they would hand over £1,225.

The liner companies had nothing to complain of. They were receiving preferential treatment all along the line, and the cargo vessels, in whose case it was proposed to revert to pre-war charges, were not receiving preferential treatment as had been suggested.

CORK AS A SEAPLANE BASE.

With a view to establishing Cork Harbour as a seaplane base, the Cork Harbour Commissioners have appointed the following Commissioners to inquire into the question:—

The chairman (Mr. Richard Wallace); Messrs. J. J. Horgan, F. J. Daly, A. C. Horne, C. C. Mercier, J. Fitzgerald, C. O'Callaghan, and J. O'Sullivan.

The committee's investigations will probably centre at Cobh (Queenstown), and it is hoped that some practical scheme may be formulated to link up the port of Cork with Great Britain and Europe by air.

REPAIR WORK FOR RUSHBROOKE.

The contract for repairing the United States Shipping Board freighter, "West Totant," has been secured by the Rushbrooke Dry Dock Co., Cobh (Queenstown). The "West Totant" recently ran ashore at Ballyholme, Co. Antrim, receiving extensive damage to her hull, and it is expected that the repairs will occupy three months.

Port of Southampton Topics.

NEW QUAY WALL BEGUN.

An important stage in the progress of Southampton's £13,000,000 dock extension scheme was reached early in February when the first of the monolith blocks which will form the foundation of the quay wall, was placed in position. There will be 78 of these monoliths placed side by side to form the new quay wall. Each will be built up on a steel shoe which will be sunk to about 80-ft. down in the bed of the River Test. When the steel portion of the monolith shoes arrives from Middlesbrough, where it is made, it is bolted into position on the site where it is to be sunk and then rivetted before the "V" shaped troughs, terminating in heavy steel cutting edges, are filled with concrete. The monoliths are 45-ft. square on plan with nine open wells each 10-ft. square, formed by internal partition walls 3-ft. 6-in. thick. As the sinking operation is performed by grabbing out the spoil from the nine wells, causing the monolith to sink slowly. As the sinking progresses, successive courses of pre-cast concrete blocks, each weighing an average of five tons, are built up until the cutting edge has reached the desired depth. Several thousand tons of large iron blocks are on hand temporarily to assist the sinking when the pressure between the sides of the monolith and the ground is sufficient to prevent them sinking under their own weight. As soon as downward movement has been restarted by this means, the cast iron blocks are removed and the building up of the courses of permanent concrete block is continued. If one side of the monolith shows a tendency to sink more rapidly than the other, so causing the monolith to lean to one side, grabbing ceases in the wells on the low side, and is concentrated on the wells on the high side until the monolith has been restored to a vertical position, when grabbing in all wells uniformly is resumed. When the monolith has been sunk to its final depth the bottoms of the nine wells are sealed with mass concrete. The three back walls will afterwards be filled with concrete or other suitable material and the front wells will be left unfilled. This will relieve the pressure on the toe of the wall and concentrate it on the heel for purposes of stability. The line of monoliths forming the quay wall will be covered by a concrete deck which, with the filling above it, will constitute the finished quay on which provision will be made for the necessary lines to carry the quay cranes and the permanent way. Amongst the materials to be used in the work will be some 600,000 tons of gravel for concrete, 90,000 tons of Portland cement, 2,600 tons of steel in the monolith shoes and 2,500 tons of steel in reinforcing bars.

A NEW SERVICE AND A NEW SHIP.

The two outstanding events in shipping movements at Southampton during February were the re-commencement of the White Star Line's direct service to Canada from the port and the coming of the "Rangitiki," the first of the three 18,000-ton ships of the New Zealand Shipping Company, to be added to the Southampton service this year. The "Megantic" inaugurated the new sailing arrangement of the White Star Line, and in April she will be joined by the "Calgaric." These two vessels will maintain a regular fortnightly service to Canada, calling at Southampton both westward and eastward bound. The visit of the "Rangitiki" marked a further strengthening of the connection of the port and the New Zealand shipping trade, of which in recent years she has

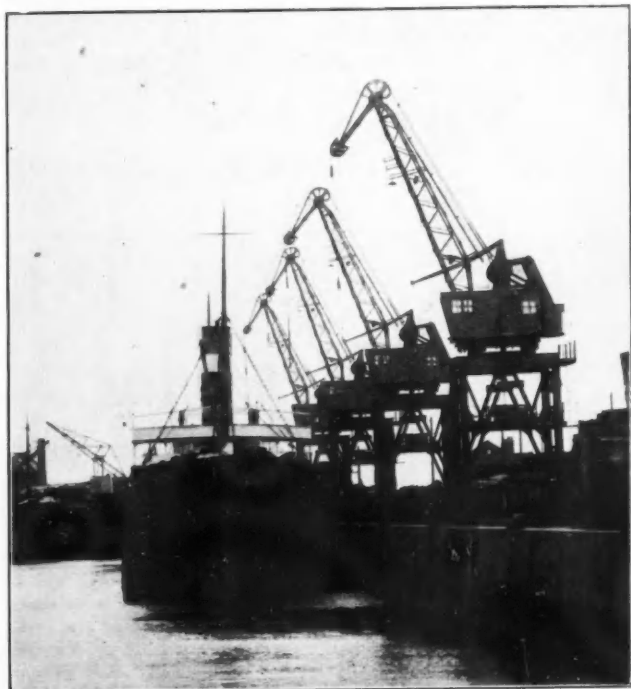
received a prominent place. The vessel represents an appreciable improvement in the type of motor ship which has been placed on the route in the last two or three years. Both the "Rangitiki" and her two sister ships embrace features in regard to passenger and cargo capacity which are a considerable advance on those of the other vessels on the route.

FOR CROSS-CHANNEL SERVICE.

The Southern Railway Company has placed an order with Messrs. William Denny and Brothers, of Dumbarton, for two new passenger steamers for the Southampton-Channel Island service to be available for the Easter traffic next year. They will be 306-ft. long overall. In them the second class accommodation will be 50 per cent. of the whole accommodation in the ship. The first class accommodation will be largely in private cabins, and among the special features will be a tea lounge on the boat deck and comfortable seating accommodation under complete shelter on the promenade deck. There will be 25 per cent. more first class accommodation on the new ships than on the "Vera," now running on the Channel Island service, and over 200 per cent. more sleeping accommodation. In the dining saloons the accommodation is increased by 45 per cent. The increased deck space should result in the new vessels having each a total carrying capacity of 1,200 passengers.

Sunderland Port and Dock Facilities.

Owing to the increase in the import traffic which has been experienced at the Port of Sunderland during the year 1928, the River Wear Commissioners have been considering how the Port facilities for handling this traffic can be improved, and have done a considerable amount in effecting such improvements during the year.



Four new "Babcock & Wilcox" 5-ton level-luffing electric cranes, East Quay, South Docks, Sunderland.

On the East Quay in the Hudson Dock, 4 new 5-ton electric cranes, obtained from Messrs. Babcock and Wilcox Limited, were brought into operation in November and are proving—especially in connection with discharging iron ore—a great acquisition in giving quick dispatch to vessels.

These cranes, which have a radius of 47-ft., are fitted with the makers' level luffing jib and with 2 ropes suitable for operating double-rope grabs when necessary.

Another improvement which has been undertaken and completed by the Commissioners this year is the equipment of the East Quay at Hendon Dock with electric power and the installation there of three 3-ton electric cranes to supplement the 4 hydraulic cranes which were already on this Quay.

The improvement of the facilities on the East Quay, Hendon Dock, was called for by the greater use to which this Dock can now be put owing to the deepening of the Junction Gateway connecting it with the Hudson Dock, which was effected in the early part of the year and which constituted the first step in bringing this Dock into greater use.

The extra depth in the Junction Gateway was obtained by removing the old invert at that place, whereby the depth of water was increased by something like 4-ft.

In order to deal adequately with the increased import traffic the Commissioners also purchased 123 wagons for Dock traffic

The Dock and Harbour Authority.

purposes during 1928, and have already arranged to obtain a further 200 wagons in the early part of 1929.

With regard to the coal shipping facilities in the Docks, it will not be premature to mention that the Commissioners are considering the construction of a new Gravity Staith in the Hudson Dock South, which will give a greater loading height and a depth of water alongside of 33-ft.

The length of the new Quay on which this staith will be situated is to be 500-ft. and the staith itself is to be fitted with four gravity spouts and at least one belt conveyor.

The plans for this work have been prepared by the Commissioners' Engineer, and it is hoped that something may be done towards carrying them into effect in the near future.

Another interesting work which has been put in hand by the Commissioners—in co-operation with Trinity House as the General Lighthouse Authority—is the conversion of the Lighthouse on Roker Pier, which is one of the best known lights on the North-East Coast, to an electric light automatically operated. The Fog Siren which is also situated in the Lighthouse has, of course, to be worked automatically also.

The work of conversion is in hand and it is expected that when the change over has been completed this Lighthouse will be an embodiment of the most up-to-date automatic machinery in existence in this class of work.

The Commissioners' Chief Engineer is Mr. W. H. S. Tripp, M.Inst.C.E., under whose supervision these improvements are being carried out.

Canadian Notes.

NEW ST. LAWRENCE GRAIN PORT.

According to the "Shipping Register" (Montreal), of January 26th, the new grain elevator to be built at Prescott, Ontario, on the River St. Lawrence, opposite to Ogdensburg, N.Y., is to have a capacity of 5,400,000 bushels. The elevator will have a daily unloading capacity of 1,000,000 bushels from uplake ships, a similar loading capacity for canal ships and barges, and also a similar loading capacity for railway cars. There will be four unloading towers with an hourly capacity of 35,000 bushels on the dip, movable along the length of the house.

Provision will be made for two of the largest uplake ships to be unloaded at the same time; for four canal boats to be loaded at the same time; and for railway cars to be loaded on four tracks, the whole of these operations to be simultaneous.

The elevator—one of the largest in Canada—is being constructed at a total cost of \$4,000,000, and it is intended to complete building in 1930, to coincide with the opening of the new Welland Ship Canal. The elevator will handle much of the grain from Western Canada shipped through the Lakes from Fort William and Port Arthur to Europe, via Montreal.

HUDSON BAY RAILWAY NEARING THE PORT OF CHURCHILL.

According to a statement issued by the Minister of Railways and Canals at Ottawa, good progress has been made on the construction of the Hudson Bay Railway, the track having now reached Mile 462, about 48 miles from the harbour being constructed at Churchill, Manitoba.

Although it was necessary, owing to the lack of overland railway communication, to proceed with the port developments at Churchill from the sea end, very satisfactory progress was made on that work also during the recent season of navigation. The expenditure on the Hudson Bay Railway to date has reached \$23,615,530, in addition to \$3,468,924 spent on the harbour development at Churchill.

The products of Western Canada now reach the British market either by way of the Great Lakes and Atlantic ports or by the Pacific ports and through the Panama Canal to Liverpool. By the latter route the distance from Edmonton to Liverpool is 10,701 miles, and from Calgary to Liverpool, 10,572 miles.

The advantage of the Hudson Bay Railway project lies in the short rail haul involved—and the cool ocean trip, which is expected to be an advantage to the dairying and stock-raising industries. What the rail haul means may be inferred from the following figures showing the distance from principal prairie points to Churchill as compared with Montreal:—

	Churchill All rail Miles.	Montreal All rail Miles.	Montreal via Great Lakes Miles.
Winnipeg ...	993	1,357	1,633
Portage la Prairie ...	938	1,412	1,689
Brandon ...	937	1,492	1,767
Regina ...	843	1,713	1,990
Moose Jaw ...	886	1,756	2,032
Saskatoon ...	847	1,828	2,133
Edmonton ...	1,146	2,158	2,464
Calgary ...	1,246	2,260	2,466

The distance from Churchill to Liverpool is 2,926 miles; from Montreal to Liverpool 2,760 miles; from Winnipeg to Liverpool, via Hudson Bay, the distance is, for most mid-west

points, at least 500 miles less than via Montreal, and from Edmonton to Liverpool, eastbound, over 1,000 miles less than via the Great Lakes.

As a concrete illustration, it may be stated that the distance from Saskatoon to Fort William is 904 miles, and from Fort William, via the Great Lakes, to Liverpool, 3,974 miles—a total of 4,878 miles. By the Hudson Bay route the distance from Saskatoon to Churchill will be 847 miles, and from Churchill to Liverpool 2,926 miles—a total of 3,773 miles, or a saving by the Hudson Bay route of 1,105 miles, with 57 miles less rail haul. The distances from various western points to Liverpool are as follows:—

	Via Great Lakes miles	Via Churchill miles
Winnipeg	4,393	3,919
Portage la Prairie	4,449	3,864
Brandon	4,527	3,863
Regina	4,750	3,769
Moose Jaw	4,792	3,812
Saskatoon	4,878	3,773
Calgary	5,226	4,172
Edmonton	5,224	4,072

FURTHER HARBOUR DEVELOPMENTS AT VANCOUVER, B.C.

Vancouver is likely shortly to have another fine new pier rivaling in size the existing Ballantyne Pier, built five years ago at a cost of \$6,000,000. The structure is to be built at Burrard Inlet.

During the past seven years \$40,000,000 have been expended on the docks, wharves, grain elevators and terminal facilities in Vancouver Harbour, but the expansion has never been ahead of the enormous increase in traffic, which in grain alone sprang from practically nothing to 80,000,000 bushels of grain per annum in that time. The proposed new pier will be additional to the existing total of 50 general cargo berths. Besides these there are 18 grain berths, five lumber docks, a sugar dock and three oil docks. Eight grain elevators give the harbour a total capacity of 10,700,000 bushels and an unloading capacity of 80,000 bushels per hour.

GRAIN ELEVATOR AND FLOUR MILL FOR WINDSOR, ONTARIO.

Plans for the construction at Windsor, Ontario, on the Detroit River opposite to the City of that name, of a \$3,000,000 grain elevator and a 5,000-barrel-per-day flour mill have been discussed recently by the City Council. A resolution was passed asking the Ontario Government to grant a long-term lease on river-front property. Construction is to be undertaken by the Grain Elevator Company in co-operation with the Michigan Central Railway, and it is hoped that the first unit, costing approximately \$1,250,000, will be completed by July 15th.

LARGE TRAFFIC INCREASE AT VANCOUVER: GRAIN SHIPMENTS MORE THAN DOUBLED LAST YEAR.

According to the annual statistical report of the Vancouver Merchants' Exchange, all export trade records for the port were broken in 1928. Increased volume of freight passing through Vancouver is emphasised by the fact that the number of vessels entering the port showed a growth of 8 per cent., deep-sea vessels numbering 30 per cent. more than in 1927. There was an increase of 40 per cent. in the quantity of foreign cargo loaded and shipped; of 124 per cent. in the quantity of grain shipped; 42 per cent. in the quantity of flour shipped; and 2 per cent. in the shipment of canned salmon. Exports of lead and spelter declined by 10 per cent. owing to the larger quantities sent out via New Westminster, and lumber shipments decreased by 2 per cent. in spite of the fact that Vancouver remains the principal shipping port with exports of 442,000,000-ft. in 1928.

Grain exports from Vancouver during the calendar year were 97,894,984 bushels, or more than twice the volume handled in 1927. Flour shipments jumped by half a million barrels as a result largely increased buying in China and in the British West Indies.

The figures for the total of freight shipped to or landed from foreign countries show a gain of approximately 1,500,000 tons for Vancouver. In 1927 the total was 4,052,777 tons. Last year it was 5,602,259 tons.

CONTINUED GROWTH AT PORT OF HALIFAX, N.S.

The continued growth of the Port of Halifax, Nova Scotia, is reflected in an increase of approximately 4,000,000 tons in the tonnage of steamers which visited the port in 1928. Unofficial figures up to December 28th show 1,915 vessels as having entered the port with a total tonnage of approximately 14,700,000 tons, compared with a tonnage of 10,855,580 in 1927.

Features of the year under review were the inauguration of special sailings by the White Star and Cunard Lines in conjunction with the Canadian National Railways, and the new service of the Canadian National Steamships, Ltd., to the West Indies, operated by the palatial "Lady" ships, of which two—

the "Lady Nelson" and "Lady Hawkins"—have already sailed.

IMPORTANT HARBOUR DEVELOPMENTS IN CANADA.

The "Shipping Register" (Montreal), in its issue of January 26th, reports that applications for amounts totalling \$38,000,000 are to be submitted to the Dominion Parliament by the various Harbour Commissions for the improvement and provision of new facilities in the ports under their control. The ports of Montreal and Vancouver are each requesting \$10,000,000, while the ports of Saint John, N.B., and Halifax, N.S., will ask for \$5,000,000 each. The ports of Three Rivers and Chicoutimi, Quebec, will each call for \$4,000,000.

The rapid growth in trade has made the provision of extensive improvements necessary at the ports named. This is especially noticeable at Montreal, which has experienced a phenomenal extension in business during the past few years, whereas at the port of Vancouver a very large new grain export business has been developed since the opening of the Panama Canal. The Maritime ports of Saint John and Halifax are both in need of larger and more modern facilities for the handling of tramp steamers, and the improvements foreshadowed are expected to enable them to handle a considerable volume of trade now being diverted to Atlantic ports in the United States, owing to the absence of these facilities.

The ports of Three Rivers and Chicoutimi are both capable of considerable expansion as they are serving rapidly-growing industrial areas. The port of Three Rivers is at the junction of the St. Maurice River, with the River St. Lawrence between Quebec and Montreal, and is the outlet for immense pulp and paper industries on the first-named river.

The port of Chicoutimi is near the head of tidal navigation on the Saguenay River, about 40 miles from its outlet from Lake St. John, and is the outlet for important electro-metallurgical, pulp and paper industries, including what is likely to become by far the largest aluminium plant in the world. The port is the junction for a rapidly-developing mining, forest and agricultural area, through which British interests are now constructing the Quebec, Saguenay and Chibougamau Railway.

Power Generation Developments.

Views of Birmingham's Chief Electrical Engineer

A notable development in modern power production is the great increase in steam pressures used in power station steam-raising plant. A few years ago it was quite exceptional to find boiler pressures of more than 300 lbs. per square inch in use. To-day we find in some American and Continental plants pressures as high as 1,200 and 1,400 lbs. being used, while a large industrial plant, which is now being constructed by the Combustion Engineering Corporation of America, will employ a pressure of 1,800 lbs. In some cases, with special or experimental boilers, over 3,000 lbs. has been tried. While in this country such excessive pressures have not come into use, the tendency in power stations here is definitely towards higher pressures with the object of increasing efficiency. It will be recalled that at the Kirkstall power station, Leeds, now under construction, a pressure of 490 lbs. will be used, while the order just placed for Battersea new super power station specifies 600 lbs. So far this has only been exceeded in Great Britain by the installation at the Stockton-on-Tees plant of Synthetic Ammonia and Nitrates, Ltd., which represents the largest steam-raising plant in the country and also employs the highest pressure, namely, 800 lbs. per square inch.

Discussing this question recently, Mr. R. A. Chattock, the chief electrical engineer to Birmingham Corporation, recalled that 25 years ago 150 lbs. was considered a high figure. Whether the high cost of apparatus, including boilers, piping, etc., necessitated with such figures as 1,200 lbs. and over, was justified by the higher thermal efficiency obtained, he considered rather doubtful. The new Hams Hall, Birmingham station, which is now nearing completion, will employ a pressure of under 400 lbs.

It is interesting to note that in nearly all cases the employment of high pressures is accompanied by pulverised fuel firing, a system which has made astonishing progress during the last few years. Apart from the high efficiency of combustion which pulverised fuel firing gives, a very important feature is its capacity to use effectively low-grade coal. During the strike period fuel having as much as 45 per cent. ash was used at the existing Birmingham stations, with the "Lopulco" pulverised fuel system, and full duty was obtained from the boilers so fired, although on the stoker-fired boilers this low-grade material could only be burned by mixing it with better-class fuels. British combustion engineering stands foremost in the world in its attainments, and although this country may not be able to show examples of such radical departures in practice as are to be seen in America and on the Continent, British practice is showing some of the best results in the world.

The Panama Canal and its Ports.

Prepared by the Board of Engineers for Rivers and Harbours, War Department, in co-operation with the Bureau of Operations, United States Shipping Board.

PORT AND HARBOUR CONDITIONS.

BRIEF HISTORY.

AS early as 1550 the nations of Europe had considered a passage-way through the Isthmus of Panama as a short cut to the Orient. Portugal, Spain, Holland, and France all made plans to cut a canal, but all were forced through circumstances to relinquish their hopes. The French, under Count Ferdinand de Lesseps, actually started operations, but, on account of insufficient funds and the ravages of tropical fevers, were obliged to desist. Finally, in 1902, the United States, upon the advice of the Isthmian Canal Commission, offered the French \$40,000,000 for their concession and equipment. This offer was accepted, and after having made treaties first with Colombia and subsequently with Panama, work on the canal was finally started in 1905. It was opened to commercial vessels on August 15th, 1914, and in 1920 President Wilson declared the work formally completed. Up to that time a total of 240,000,000 cubic yards of earth had been excavated and a total of \$366,650,000, exclusive of appropriations for defence, had been expended.

GENERAL DESCRIPTION.

The Panama Canal lies between the eighth and tenth parallels of north latitude and the 79th and 80th meridians west longitude. It connects the Caribbean Sea with the Pacific Ocean at the lowest point in the Continental Divide. The canal runs from north-west to south-east, almost at right angles to the axis of the Isthmus.



Dredging Division Activities: Improvement Project No. 2. View looking North from Station S. West Bank, showing finished project, South end.

The canal zone includes all land extending five miles on both sides of the centre line of the canal channel; that beyond, up to the 100-ft. contour in Gatun Lake; an extension of the Fort Sherman Military Reservation at the mouth of the Chagres River; and Alhajuela Basin in the upper Chagres Valley. By the terms of the treaty the Panaman cities of Colon on the Atlantic side and Panama on the Pacific side are retained by the Republic of Panama and are not included under the jurisdiction of the United States. The total area of the Canal Zone is approximately 554 square miles, composed as follows:—

	Square miles.
Land area inside of 5-mile limit	332.35
Gatun Lake area inside of 5-mile limit	106.40
Gatun Lake area between 5-mile limit and 100-ft. contour	84.20
Miraflores Lake at elevation plus 55-ft.	1.90
Area of channel from Atlantic coast to Gatun Locks and Pacific coast to Miraflores Locks	.85
Land at mouth of Chagres River and Large Remo Island	6.40
Alhajuela Basin	21.80
Total	553.90

The above total does not include two small, non-contiguous areas used for the Punto Malo radio station and a military reservation at Paitilla Point.

In transiting the canal from the Atlantic to the Pacific a vessel passes through a dredged channel 500-ft. wide, 40-ft. deep at mean low water, and 5.77 miles long, leading to the Gatun Locks, the first of a series of three locks. The Gatun Locks, which consist of three flights of chambers, raise the vessel

from sea level to Gatun Lake, a lift of 85-ft. These locks are double, being 1.04 miles long and 110-ft. wide. Each chamber is 1,000-ft. long, with intermediary gates which can shorten the length for smaller vessels and thus conserve water. All



Dredging Division Activities: Improvement Project No. 2. View looking South from Station I. East Bank, showing general conditions East and West side of Canal.

operations are performed from a central control station. The ship is moored to electrically operated mules which run on tracks on both sides, pulling the ship through and keeping it in position so that it will not injure itself or the mechanism of the locks.

Once out of the Gatun Locks, the vessel proceeds under its own steam through a channel in Gatun Lake. This channel varies in width from 1,000 to 500-ft. and from 85 to 45-ft. in depth. It does not run in a straight line through the lake, but follows the former valley of the Chagres River, the waters of which have been impounded to form Gatun Lake. Having passed through the lake, the vessel enters Gaillard Cut (Culebra Cut), a distance of 20.55 miles from Gatun Locks. This cut is 300-ft. wide, 45-ft. deep, and 6.97 miles long.

At the Pacific end of Gaillard Cut the ship passes through San Pedro Miguel Locks, a single flight of double chambers. This flight of locks is 0.75 of a mile long, with a drop of 31-ft. to the level of Miraflores Lake.

Passing through Miraflores Lake in a channel 500-ft. wide, 45-ft. deep, and 0.86 of a mile long, the ship enters Miraflores Locks consisting of two flights of double locks 0.91 of a mile long, with a drop of 54-ft. more or less, depending upon the state of the tide, to the level of the Pacific Ocean.

The channel from Miraflores Locks to the Pacific is 500-ft. wide, 35-ft. deep at mean low water, and 6.99 miles long. The total length of the canal from entrance to entrance is 43.85 nautical miles, and the limiting depth at mean low tide is 35-ft.



Dredging Division Activities: Improvement Project No. 2. View looking West from Station H. East Bank, showing South end of slide and project. Dredge working on South shoulder.

PORTS.

There are two ports of entry in the Canal Zone—Cristobal on the Atlantic side and Balboa on the Pacific. Cristobal is

part of the harbour of Colon, but is under the jurisdiction of the United States. Both ports are equipped with piers, dry docks, and fueling facilities. A detailed description of these ports will be found elsewhere in this report.

TIDES AND TIDAL CURRENTS.

The tidal range on the Atlantic side of the canal is from 1 to 2-ft.; on the Pacific side the average is about 12½-ft., occasionally being as much as 21-ft. Tidal currents at the Atlantic entrance are almost negligible, although a small current in the direction of the docks is apparent during a stiff north-westerly wind. Around the Cristobal coaling station there is sometimes a current due to the outflow from the French Canal after a heavy rain or when there have been heavy down lockages from Gatun.



Dredging Division Activities: View of Middle Section on permanent dump area "C," showing condition of dump. Pacific Entrance, looking Eastward from old Sand Track.

At the Gatun Lake side of the Gatun Locks there is a noticeable current of from 0.3 to 0.6 of a knot when the spillways of Gatun Dam are open.

Opposite Gamboa Bridge, when the Chagres River is at high stage, a strong cross current in the canal may be expected. The greatest current that has been measured at this place was 8.5 knots on October 23rd, 1923.

Tidal currents of a knot or over are found in many places in the canal channel, but they are of little importance since they parallel the channel.

Currents about Dock No. 6 at Balboa are troublesome, especially in falling tides. The currents opposite the oil-bunkering station are noticeable because they run diagonally to the canal channel. With a falling tide they drift a docking ship against the crib and, on a rising tide, away from the crib.

WEATHER CONDITIONS.

The mean temperature of the Canal Zone for years of record is 87.5 degrees on the Pacific section and 84.8 degrees on the Atlantic section. The maximum temperature of record is 97 degrees and the minimum of record 63 degrees. The greatest daily range of temperature on the Pacific side was 27 degrees and on the Atlantic side 21 degrees.

The prevailing direction of winds in the Pacific section is north-west, and in the Atlantic section north. The Canal Zone is out of the territory of hurricanes. The hourly average velocity of winds is about 10.5 miles; the maximum of record on the Pacific section is 59 miles, while that on the Atlantic section is 46 miles.

The average annual rainfall ranges from 157.49 inches at Porto Bello in the Atlantic section to 51.58 inches at Taboga in the Pacific section.

HEALTH CONDITIONS.

Excellent general health conditions prevail in the residential districts of the Canal Zone and in the adjoining cities of Panama and Colon. Contagious diseases such as yellow fever, bubonic plague, and smallpox, which formerly made the zone a dangerous locality, have been practically controlled, and but few cases of malaria occur.

PORT CUSTOMS AND REGULATIONS.

ADMINISTRATION.

The administration of the canal is vested in a governor as the head of the organization known as the Panama Canal. The governor reports to the Secretary of War, who represents the President in the administration of canal affairs.

The terminal ports of the Panama Canal are administered for the governor by the marine superintendent, who is a captain of the United States Navy assigned to this particular station for a period of four years. The marine superintendent is the chairman of the Board of Admeasurers, which consists of two members and one recorder, and he is also in charge of the light house and salvage section.

Under the marine superintendent are the captains of the ports of Cristobal and Balboa, both of whom are Commanders in the

United States Navy assigned to this duty for four years. The captain of the port has under his jurisdiction all pilots, masters of towboats, a harbour master, admeasurers, and dispatchers. The captain is charged with the enforcement of regulations relating to the navigation of the canal, terminal ports, waters adjacent thereto, and enforcement of harbour regulations, including the berthing and mooring of vessels, inspection, and admeasurement of vessels. He is charged with the entrance and clearance of all vessels that enter and clear the terminal ports of the Canal Zone, denying entrance or departure until all laws and regulations concerning quarantine, customs, immigration, navigation, tolls, and dues are complied with; he is required to keep on hand a set of charts, a light list, sailing directions, and other usual data needed for sailing; he is prepared to give information to masters and others in relation to the navigation of the canal waters and the usual steamship routes; he assists in protection against fire in the harbours and along the waterfronts; makes note of all accidents or damages to vessels, floating equipment, wharves, aids to navigation, etc., and is prepared to give evidence or recommend adjustment, as the case may warrant.

The Panama Railroad Co., through its receiving and forwarding agent, loads and discharges all vessels using the ports of Cristobal or Balboa, except the vessels of those lines which have been granted permission to use their own stevedores for this purpose.

QUARANTINE AND IMMIGRATION.

The administration of quarantine, immigration, and customs regulations is under the jurisdiction of the chief quarantine officer and the chief customs inspector, who are appointed by the governor, the former having charge of quarantine and immigration and the latter of customs.

The division of quarantine is charged with the enforcement of quarantine rules and regulations in the Canal Zone waters and in the harbours of Panama and Colon. It is authorised to adopt such measures in regard to vessels, crews, passengers, and cargo as may be necessary to protect these areas from quarantinable diseases, to grant pratique, to certify bills of health, and to perform such other duties as may be assigned by proper authority.

All vessels arriving in the Canal Zone, except those clearing from the ports of Panama which are known to be free from quarantinable diseases, will be considered in quarantine and will fly a yellow flag at the foremast until permission to lower the same is granted by the quarantine officer and the vessel granted pratique. Masters submit to the quarantine officer all papers necessary for the conduct of quarantine, and the latter arranges for the proper inspection of vessel, cargo, crew, and passengers.

After quarantine inspection the quarantine officer grants free pratique or declares the vessel in quarantine as he may decide. Free pratique authorises the vessel to transit the canal, to dock, and do such things as are legal and customary. Pratique by radio is given at the discretion of the chief quarantine officer to merchant ships which contemplate transiting the canal without discharging or landing either persons or cargo. The following diseases have been designated quarantinable: cholera, yellow fever, bubonic plague, smallpox, typhus fever, leprosy, and anthrax.

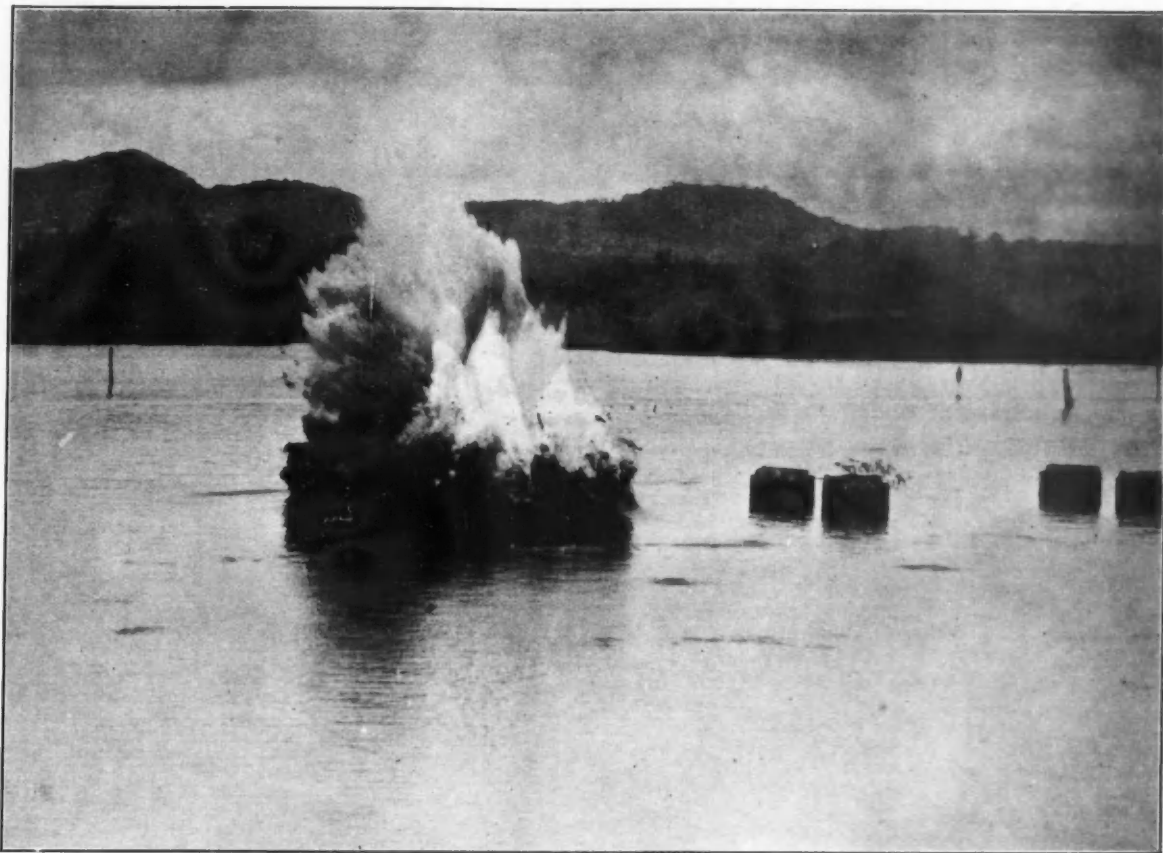


Dredging Division Activities: Improvement Project No. 2. View looking South from Station V, showing South end of project after completion.

CUSTOMS.

The ports of the Panama Canal have certain characteristics of both American and foreign ports. So far as the United States customs is concerned the canal ports are considered foreign, and invoices are issued by the canal customs authorities. Two copies of the manifests of outgoing cargo are required by customs. The canal customs do not collect duties on cargo which is for ultimate delivery to the Republic of Panama, but retains such cargo until it is released by the proper authorities of Panama. Three copies of the manifests of such cargo,

The Panama Canal and its Ports.



Dredging Division Activities: View showing demolition of Caissons, 16-ft. in diameter, of old Panama Railroad Dock, Balboa Harbour.



Dredging Division Activities: Improvement Project No. 2. View looking West from Station I. East Bank, showing Dipper Dredge working on South shoulder.

certified by the master of the vessel, must be furnished the canal customs.

Vessels may enter the ports of Balboa and Cristobal on the report of the customs boarding officer, and it is not necessary for the master to come ashore for that purpose. Ships transiting the canal, entered at Balboa, are required to clear from the port of Cristobal, and vice versa. Clearances are issued by the customs or the port captain. The chief customs inspectors at the canal ports are also deputy shipping commissioners, and their duties include certain duties of collectors in American ports and of American Consuls in foreign ports. Marine notes of protest may be entered and sworn to before the chief customs inspector at either port.

MEASUREMENT OF VESSELS.

TONNAGE CERTIFICATE.

It is important that vessels which expect to use the Panama Canal should provide themselves with the proper tonnage certificate, based upon the rules laid down for Panama Canal measurement. The rules, regulations and laws which govern this measurement vary from those for similar measurement on the Suez Canal and in the United States and foreign countries, and vessels require a re-measurement in order to conform to the Panama rules.

The collector of customs at New York, the collectors in some of the other large cities of the United States, and certain properly designated officials abroad have been authorised to measure vessels under the Panama rules and issue the required certificate, and in order to avoid delay and measurement upon their arrival at the canal it is strongly recommended that all vessels provide themselves with the proper certificate before their arrival in canal waters.

In case a vessel has failed to provide herself with the proper tonnage certificate it will be of great assistance and save time if she be provided with a full set of blue prints of her plans and a copy of the measurements which were made when she received her tonnage certificate, and also the tonnage certificate itself.

Vessels which have the proper certificate will probably suffer no delay in transit, but those which are not so provided will be delayed until the proper measurements can be made.

Foreign vessels may be measured not only in their home ports but also in the port of New York, and probably in other large American ports, without any additional charge, but those desir-



Floating Crane "Hercules" at Gatun Locks.

ing such measurement should give sufficient notice in advance and appoint a date when they will be empty so as to facilitate the measuring.

Under any conditions the canal authorities reserve the right to check and correct any measurement or certificate issued elsewhere.

(The rules governing the measurement of vessels are published by the Panama Canal office).

RULES AND REGULATIONS GOVERNING TRANSIT OF THE CANAL.

These rules apply to all waters which are now or may hereafter be under the jurisdiction of the Canal Zone government.

The canal authorities may deny any vessel passage through the canal the cargo of which is of such a nature that it might, in any way, endanger the locks, wharves, equipment, or any



Coaling Ship from Car at Pier No. 8, Cristobal.

part of the canal, by being explosive or highly inflammable. The further right is reserved to them to impose such safety regulations as they may see fit upon any such vessel while in canal waters.

Vessels whose cargoes consist of high explosives should, before leaving their ports of departure, when practicable, obtain permission from the canal authorities to use the canal. In requesting such permission the character and approximate amount of explosives should be stated, the ports of departure and destination, name of ship, and party to whom consigned. This may be done by mail or cable. In general, permission will not be refused, but these precautions are taken to safeguard the canal's interests. Vessels loaded with volatile crude oil products must obtain permission to pass through after arrival, and this will be granted unless there be some exceptionally good reason to the contrary.

Vessels carrying explosives consigned to ports beyond the ports of the Canal Zone will not be allowed alongside the wharves while such explosives are on board. Vessels having explosives consigned to Canal Zone ports must obtain special permission from the port captain before they will be allowed alongside the wharves, and must discharge such explosives before handling any other cargo. Each instance will be handled upon its individual merits.

In any case where the condition of the cargo, hull, or machinery of a vessel is such that it is liable to endanger or obstruct the canal, permission to enter or pass through may be refused until steps have been taken to remedy the defect.

Vessels are towed through the locks by electric locomotives, using 1½-in. steel wire towing lines. Normally, the number of locomotives used is as follows:—

Length of vessel (p.p.) in feet:—		
Up to 349	... ..	number 4
350 to 499	... ..	" 6
500 and over	... ..	" 8

These numbers are subject to change, due to other conditions, such as list, trim, or peculiar construction of a ship. In all cases the canal pilot on board determines the number to be used.

The Panama Canal and its Ports.



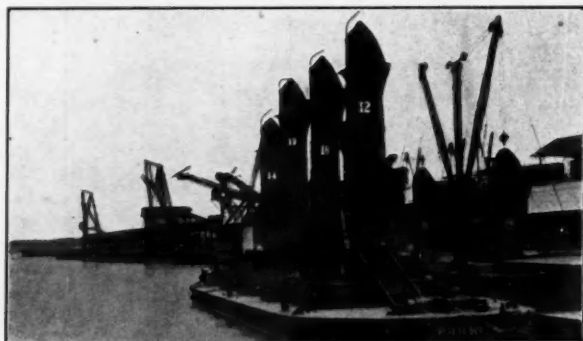
Dredging Division Activities : Improvement Project No. 2. View looking South from Station E. East Bank, showing slide section.



(Photo by courtesy of U.S. Army Air Force).

Dredging Division Activities: Improvement Project No. 2, at Lirio. Aerial View looking North from over Gold Hill, showing Dipper Dredge digging on Prism Line at centre of project.

The canal authorities may dispatch vessels through the canal in any order and at any time they may see fit; priority of arrival at a terminal does not give any vessel the right to pass through the canal ahead of another that may arrive later, although this will be a consideration in determining the order of passage. Steamers actually carrying fifty or more through passengers will be given preference over other vessels in transiting. To avail themselves of this privilege such vessels, however, must report by radio the number of such passengers on board.



Coaling Station at Cristobal.

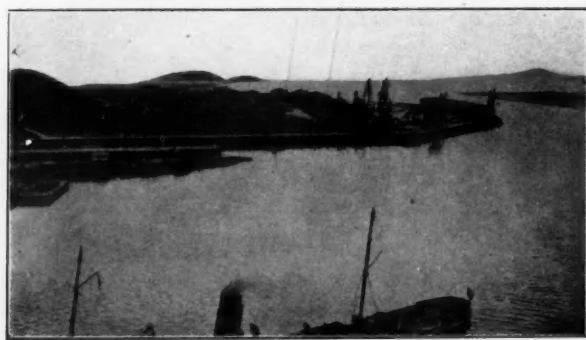
The canal authorities may hold a vessel for the purpose of investigating any report made against her by the proper persons, for the violation of the rules of the canal or the laws of the Canal Zone or of the United States, or for the investigation or adjustment of any claims or disputes that may arise on either side, but no vessel shall have any claim for damages against the canal for any delay in consequence thereof.

Unauthorized possession or transportation of intoxicating liquors in the Canal Zone is a violation of Title III., section 20, of the United States national Prohibition Act. The transportation of intoxicating liquors in transit by vessels is not prohibited. Liquors for medical stores may be procured by application to the chief health officer, and orders for liquors for ships' stores for foreign vessels and for American passenger vessels for use outside of the Canal Zone must be approved by the chief customs inspector.

Whenever in the judgment of the receiving and forwarding agent, or port captain, it is deemed advisable to shift any vessel not fully engaged in receiving or discharging cargo, in order to accommodate other vessels, or for any other reason, shifting will be made by direction of the port captain, and the towing and other expenses thereby incurred will be charged against the vessel so shifted. No vessel at any dock or moorings within the Panama Canal shall disable her engines or otherwise be rendered inoperative except on specific authority from the port captain concerned.

If a vessel is not boarded immediately on arrival she may anchor and await the boarding party. Vessels anchoring at the Pacific entrance will do so in an area bounded by San Jose Rock, Flamenco Island, channel buoys Nos. 4 and 2, and at the Atlantic entrance, just inside the west breakwater. Should a vessel desire a pilot to meet her outside of the Atlantic breakwaters, she should remain there and make signal to that effect.

All vessels entering port must take the berth or docks assigned them by the port captain.



Pacific Entrance and Balboa Harbour.

No vessel will be allowed to anchor in any part of the canal except in an emergency. Vessels may be permitted by the port captain to anchor in Gatun Lake, in suitable localities outside the prism limits, or to moor to the approach walls of the locks, or in established mooring stations.

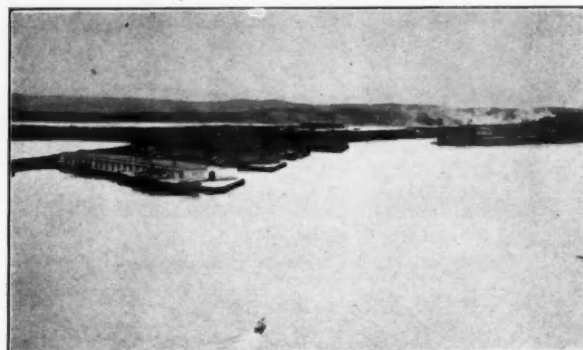
The captain or master of a vessel in canal waters, except while the vessel is being passed through the locks, shall be charged with the safe handling and proper navigation of the vessel; the pilot is to be considered as being on board solely in an advisory capacity, but masters of vessels must abide by the rules and regulations of the canal as interpreted by the pilot.

The Panama Canal assumes responsibility for the safe handling of a vessel in the locks from the time the first towing wire is made fast on board, on entering, until all towing wires are cast off, on leaving. This holds good, however, only in cases where the vessel has complied with all the requirements of these regulations, and where motive power, steering gear, and other appurtenances for controlling the ship function properly.

Incoming ships will be boarded inside the Atlantic breakwater or off the seaward end of dredged channel at the Pacific entrance by a boarding party, which consists, in addition to the pilot, of the quarantine officer (immigration), boarding officer (customs), admeasurer, and commissary representative. Ships arriving between sunrise and 10 p.m. will be boarded on arrival. Those arriving after 10 p.m. will be boarded at sunrise, remaining in quarantine anchorage meanwhile; except that such vessels requiring fuel oil only may, by prior arrangement through their agents and upon guaranties that there shall be no communication between the ship and shore before pratique is granted, berth at fuel docks for the sole purpose of bunkering during the night.

METHODS USED IN COLLECTING PANAMA CANAL TOLLS.

There are several ways by which money may be advanced to cover canal charges. The simplest and most direct way is to make a deposit with an assistant treasurer of the United States, who will, on request, telegraph the Washington office of the Panama Canal, which will in turn cable notice of the placing of the deposit to the canal authorities on the Isthmus. Owners or agents of vessels in a foreign country may direct a bank to place deposits with an assistant treasurer of the United States. This done, the conduct of the remainder of the business is in the hands of the Government.



Atlantic Entrance and Cristobal Harbour.

Another method which may be followed in making a deposit is to deposit high-grade bonds with the assistant auditor of the Panama Canal in Washington as security to make payment by draft. Draft to the value of the bonds will then be accepted for conversion and for cash. This arrangement is especially convenient for companies having frequent sailings through the canal.

A third method is to make payment in cash to the collector on the Isthmus. Whatever method of advance payment is used, the funds should be amply sufficient to cover estimated tolls as well as other probable expenses. The balance due the depositor, after payment of vessel's expenses, will be refunded to him by cheque on the Treasury of the United States directly after his vessel clears from the canal.

FIRE PROTECTION.

The terminals at Balboa and Cristobal each have two tugs equipped for fighting fire. All piers are piped their full length, and a pressure of 135-lbs. is maintained by means of special fire pumps. Modern land equipment is available near the waterfront at both ports.

PILOTAGE.

Except when exempted in each case by the Governor of the Panama Canal, no vessels are allowed to pass through the canal, enter or leave a terminal port, manoeuvre, shift berth, go alongside or leave any wharf or dock in canal waters without having a regularly authorised pilot on board and specific authority from the port captain. The fact that the master or any officer of any vessel holds a pilot's license for any of the waters of the Canal Zone will not authorise the vessel to enter or move without a Government pilot. No vessel in danger or distress will be prohibited from entering a terminal port at any time in case of necessity or emergency; but such vessel should, when practicable, give due notice in advance, by radio or otherwise, and obtain a pilot, if possible.

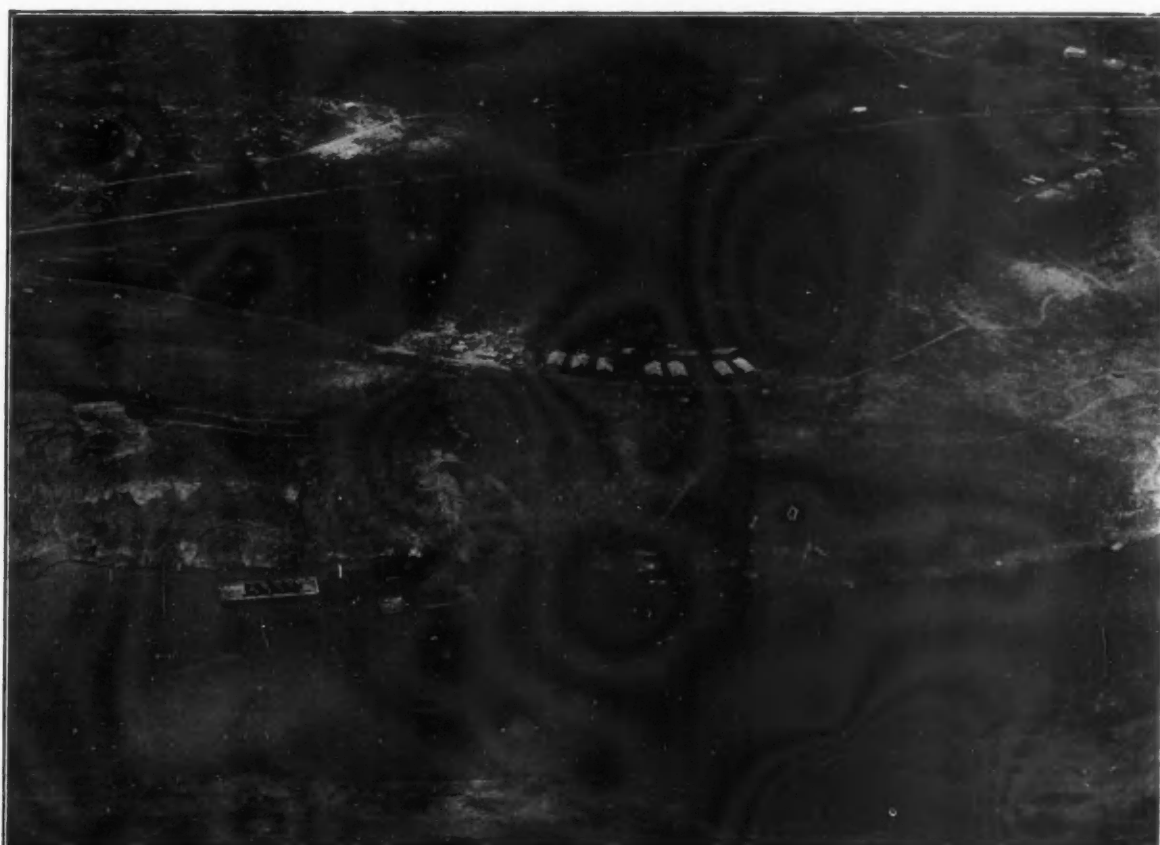
No person, steamer, company, or corporation will be allowed to maintain or employ pilots in canal waters for the exclusive use of their own or any other vessels; all pilots, without exception, must be duly authorised and licensed by the canal authorities and be in the employ of the canal. This shall not be interpreted to mean that the canal authorities shall be

The Panama Canal and its Ports.



(Photo by courtesy of U.S. Army Air Force).

Dredging Division Activities: Improvement Project No. 2. Aerial View looking Southward, showing Dredge at work on new West Prism Line at Lirio.



(Photo by courtesy of U.S. Army Air Force).

Dredging Division Activities: Improvement Project No. 2, at Lirio. Aerial View looking Westward over East Bank, showing Dipper Dredge at work on Prism Line. Grader in position ready for sluicing. Lirio Camp in middle distance on top of bank. April 12th, 1928.

prohibited from issuing restricted pilot licenses for small craft in canal waters or any other that they see fit.

Pilots will meet incoming vessels inside of the breakwaters at the Atlantic terminal and outside of the seaward end of the dredged channel at the Pacific terminal; should there be any delay, vessels may anchor just inside of the Atlantic breakwaters or to the seaward of the canal entrance on the Pacific side, make the usual signal for a pilot, and await his arrival. Should a vessel desire a pilot to meet her outside of the Atlantic breakwaters, she should remain there and make signal to this effect.

Whenever practicable, vessels should send notification of the probable time of their arrival by radio or otherwise, so that pilots may meet them promptly.

No claim against the Panama Canal for damages on account of injury to a vessel or to cargo while in canal waters arising from the operation of the canal (other than the passing of the vessel through the locks) shall be allowed unless it shall be determined by the Governor of the Panama Canal that such injury was due to the negligence or want of care on the part of agents or employees of the Panama Canal, and there shall be an appropriation available for the payment of such claims.

The pilot shall be freely consulted at all times to insure safety in navigation and that no accident or damage result from ignorance on the part of the master or officers of the vessel in transit, and should any master, officer, or persons connected with the ship give or cause to be given any order, or direct any change of speed or direction of the ship on his own initiative, without knowledge of the pilot, which may result in damage to his own or any other vessel, dredger, or property of any kind, or endanger or block the canal, or any of its equipment, he will be held strictly responsible, and the vessel itself may be held by legal process until settlement in full shall have been made to cover any loss or damage that may have resulted in consequence thereof.



Piers Nos. 6, 7 and 8, Cristobal.

Inasmuch as every vessel has its own individual peculiarities in handling, answering her helm, and variation in headway due to speed, it shall be the duty of the master of the vessel, or his qualified representative, to be present at all times on the bridge of the ship to keep the pilot informed in regard to these matters, so that the pilot may be best qualified to give advice in regard to navigating the ship safely.

The pilot should not only be freely consulted at all times on matters relating to the navigation of the ship, but to the rules and regulations pertaining to the same, to signals, locks, weather, or other matters of importance relating to the movements of the vessel. While on board he is the properly qualified representative of the canal authorities in these matters, and should any accident or damage result from failure to consult him, or from not following his advice, the vessel shall be held responsible for such accident or damage.

When, in the opinion of the pilot, the master or captain or their representatives shall fail to follow his advice and thereby endanger his own or any other vessel or any part of the canal or its equipment, the pilot shall then direct the master or captain of such vessel to stop, anchor, or moor, until the facts have been laid before the canal authorities.

In all cases the pilot boarding an incoming vessel shall be the judge as to whether or not she is ready for transit, pending reference of the matter to the port captain.

Pilotage is furnished under three classes, viz.: (a) Transit pilotage; (b) port pilotage; and (c) offshore pilotage. The charges for these services are as follows:—

- | | |
|---|---------|
| (a) Port pilotage, based on the maximum salt-water draft, per foot, or fraction thereof equal to or more than 6 inches | \$2.00 |
| (b) Transit pilotage, based on the maximum salt-water draft, per foot, or fraction thereof equal to or more than 6 inches, each way | \$5.00 |
| (c) Offshore pilotage, per vessel | \$25.00 |

The application of these charges is explained below.

Port pilotage.—This applies to vessels visiting terminal ports without transiting the canal; and also to vessels which, in addition to transiting the canal, stop at either terminal and there receive or discharge passengers or freight. All vessels,

including vessels transiting the canal, using a port in the Canal Zone as a terminus for the discharge or receipt of freight or passengers will be charged both on entering and leaving port.

Vessels transiting the canal and using the port at either end of the canal solely for the purpose of receiving repairs, fuel, or supplies, or of allowing the through passengers to land or transit the Isthmus by train, are charged only for entering the port prior to transiting the canal, and for leaving port after having transited the canal, except that no charge is made, out or in, against through vessels stopping at either terminal for one-half hour or less without going to a dock.

No charge for pilotage is made against a vessel solely on account of its acceptance or delivery of mail originating in or destined to the Canal Zone or Republic of Panama.

Pilotage is not charged when a vessel is shifted from one berth (at dock or permanent mooring) to another berth (at dock or permanent mooring). This exemption does not apply in the case of a vessel shifted from anchorage to dock (or permanent mooring), or the reverse. However, vessels assigned temporarily to anchorage on arrival pending availability of berth at dock are not assessed additional pilotage by reason of such double manoeuvres, and the same general principle applies to outgoing vessels.

Transit pilotage applies only to vessels transiting the canal. It covers the actual transit, and, in connection therewith, berthing at terminals for the sole purpose of bunkering and/or reports.

There is no charge for transit pilotage, except for vessels transiting the canal from Cristobal to Balboa and return for the sole purpose of having repairs made at the Balboa dry dock and shops.

Pilotage is not charged against a vessel stopping in the canal prism solely for the purpose of embarking or disembarking passengers travelling only from one terminal of the canal to the other.

Vessels transiting the canal and making a substantial reduction in favour of Panama Canal and Panama Railroad employees from regular passenger rates charged by such vessels will not be charged pilotage solely by reason of embarking or disembarking passengers and baggage when such passengers are employees of the Panama Canal or Panama Railroad Co.

Offshore pilotage applies to vessels taking pilots outside Atlantic breakwaters. The charge for this service is in addition to port pilotage in cases where the latter is also applicable.

DOCKAGE OR WHARFAGE.

The charge known as "dockage" in the United States is termed wharfage in the Canal Zone. This charge is separated into two main classes—one for sailing vessels and the other for steam or power driven vessels, including all auxiliary vessels. The charges as published in Tariff No. 8 are as follows:—

Sailing vessels:—	Per linear ft. per day.
Not exceeding 100-ft. in length between perpendiculars	\$0.05
Over 100-ft. in length between perpendiculars	\$0.10
Steam or power driven vessels, including all auxiliary vessels: On measurement between perpendiculars	\$0.15

Sailing vessels not exceeding 100-ft. between perpendiculars when clearing from wharf within five hours after berthing are charged two-thirds of the regular daily wharfage rate, with a minimum charge of \$1.

All vessels over 100-ft. in length between perpendiculars and all steam or power driven vessels, including auxiliary vessels, clearing from wharves within five hours after berthing are charged two-thirds of the daily rate.

The full daily rate is charged for any part of a day that wharves are occupied after the first day, except that when a vessel occupies a berth all or any part of three hours after the expiration of a 24-hour period one-fourth of the daily rate is charged for that time.

The foregoing charges are made against vessels handling cargo or passengers either at Cristobal or Balboa.

All other vessels docking at a wharf owned or controlled by the Panama Canal or Panama Canal Railroad Co. for any purpose other than the handling of cargo or passengers are charged one-half of the foregoing rates, except that no charge is assessed against vessels docking at the coaling plants solely for the purpose of securing coal, and that no wharfage is charged vessels docked at repair wharves of the mechanical division solely for the purpose of securing repairs from the Panama Canal. If a vessel undergoing repairs remains at a mechanical division repair wharf for a longer period than necessary to effect repairs or discharges cargo or passengers, or receives cargo, passengers or supplies, the period for which wharfage is charged is determined by the port captain, after consultation with the superintendent of the mechanical division.

When a vessel receives or discharges at the coaling plant, either at Cristobal or Balboa, one or more tons of cargo, or ten or more bags of mail, or three or more passengers, a charge for wharfage is made at regular rates.

When cargo is handled to or from ships in lighters for the use of which a charge is made against the vessel, wharfage is charged on the lighters at the wharves while loading or unloading cargo at the same rates applying to sailing vessels.

"Per day," as given in the above schedules, is interpreted to mean a period of 24 hours from time of berthing.

Lighters required to transfer cargo when a berth is not available will be furnished free. In such cases the usual charges for labour, stevedoring, and transferring cargo apply. When lighters are furnished to a ship at a berth at the request of the ship, solely to expedite loading and discharging, or to a ship in quarantine, or to a ship discharging explosives in the bay, the regular charges for lighters are made, including the usual charges for wharfage, stevedoring, transferring, and towage, except that if the receiving and forwarding agent, to reduce the cost of transferring cargo, uses lighters to discharge or load ships at berth, no charge is made for lighters or the wharfage thereon.

STORAGE.

Since the commerce of the two canal zone ports is either "in transit" or for local consumption, warehouses are not in demand. Cargo consigned to the Canal Zone for orders will be stored in the transit sheds of the Panama Railroad piers.

At Mount Hope there is a modern fireproof cold storage warehouse with a capacity of about 880,000 cubic feet. This plant is used mainly for the storage of perishables consumed within the zone, but commodities consigned to the zone for orders may be stored there on application. If necessary, the Panama Railroad will supply refrigerator cars for the transportation of such commodities from shipside to warehouse, and vice versa.

The following rates for storage on piers are in effect in the Canal Zone:—

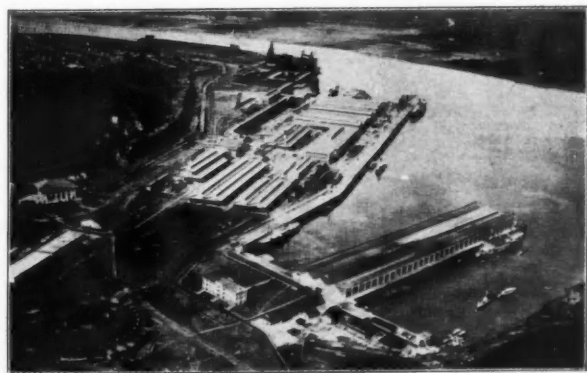
- (1) Transit cargo, routed and unrouted:

For first 35 days after delivery on pier	...	Free.
For succeeding 30 days, per ton, per day	...	\$0.03
Thereafter, per ton per day	...	\$0.05
- (2) Local cargo:
 - (a) For first 72 hours after cargo is ready for delivery and notice given
 ... | Free. |
 - (b) Thereafter, per 100-lbs. per day; minimum charge \$0.25
 ... | \$0.03 |
 - (c) Or, per car per day or fraction thereof, company's option
 ... | \$3.00 |
 - (d) Sundays and holidays, on which the freight house is closed, are excluded from both free and chargeable time.
Free time begins at noon or 7 a.m. after notice.
- (3) On specie and other commodities on which freight is charged ad valorem:

For first 72 hours	...	Free.
For each succeeding period of 72 hours or fraction thereof (Sundays and holidays excepted)	1/16 of 1 per cent. ad valorem	

LOADING AND DISCHARGING VESSELS.

Freight-handling machinery.—The piers at Balboa and Cristobal are well supplied with mechanical facilities for handling package and other freight. Practically all piers have cargo booms and portable electric winches. For heavy lift cargo the two floating cranes, "Ajax" and "Hercules," are available. These cranes are capable of lifting 250 tons each. They are described under "Floating equipment." (A more detailed description of freight-handling appliances is given under heading "Piers, Wharves and Docks.")



(Photo by courtesy of U.S. Army Air Force).
General View of Balboa Terminals.

HANDLING INWARD DUTIABLE CARGO.

Under arrangement with the Panaman Government, the commerce entering the ports of Balboa and Cristobal destined for points in the Republic of Panama is received by the customs officials of the United States and held by them until released by the proper officers of the Panaman Government. Customs fees assessed on such cargo are collected by American customs officers at the port of discharge.

HANDLING TRANSIT CARGO.

As has been previously stated, there are no facilities for storage of commodities other than in the transit sheds of piers.

"In transit" cargo, therefore, after being unloaded from the ship, is stored in these transit sheds until the forwarding ship is ready to pick it up.

HANDLING CARGO FOR ORDER.

Under recent plans, goods are consigned to the Panama Canal Zone for order; that is, the ultimate destination of such cargo being unknown, it is sent to the Canal Zone in anticipation of future consignment orders. Cargo under this classification, through the co-operation of several lines, takes a through rate, each carrier taking out of the freight its share in proportion to the distance carried.



Interior of Shed on Pier No. 18, Balboa.

STEVEDORING CONTRACTORS.

Practically all of the stevedoring is done by the Panama Railroad. There are, however, several lines which have been granted the privilege of stevedoring their own ships, but these companies do not compete with the organisation of the Panama Railroad for the stevedoring of other ships.

LABOUR.

There is an ample supply of labour in the Canal Zone for handling cargo with no appreciable competition for it from other industries. Stevedores and longshoremen on the "silver" pay rolls receive from 20 to 23 cents an hour.

AGENCY FEES.

The Panama Railroad Co., through the receiving and forwarding agent, at Cristobal, is prepared to act as agent for any vessel desiring to transit the canal, when such vessel has no other local agent to look after its interests.

The agency fee is \$25 per vessel. This fee covers the services ordinarily performed by a local agent and includes the expense of arranging for purchasing fuel and other supplies, sending cablegrams and mails, securing bills of health, having consular documents visaed, and similar service.

No fee is charged if the vessel requires no service other than the procurement of fuel or supplies from the Panama Canal or Panama Railroad Co.

The handling of agency work for vessels making Canal Zone ports a regular stop for handling cargo or passengers, and requiring soliciting of cargo or passengers, or handling of claims, will be subject to special arrangements.

If funds are advanced by the Panama Railroad to cover a vessel's expenses the charge is 2½ per cent.

FUEL AND SUPPLIES.

ELECTRIC CURRENT.

Electric current is supplied to the entire Canal Zone by the hydro-electric plant at the Gatun dam. The piers and wharves at Cristobal and Balboa are able to furnish electricity to vessels both for power and light. Alternating current is available at 220 volts for power and 110 volts for lighting.

PROVISIONS.

Provisions in any quantity required by ships can be supplied by the commissary department of the Canal Zone. Delivery is made at either end of the canal according to the desire of the vessel. Vessels shall place orders with the boarding officer, who will arrange for delivery.

WATER SUPPLY.

Water, suitable both for boilers and drinking, is available at either Balboa or Cristobal. Vessels transiting the canal may obtain fresh water from Gatun Lake upon permission from the proper authorities.

COAL BUNKERING.

The two coaling plants at the termini of the Panama Canal have a combined emergency storage capacity of 700,000 tons. Their normal storage capacity is approximately 500,000 tons. The Balboa plant has not been used for some time, since there has been but little demand for coal at the Pacific end of the canal.

The Cristobal plant is built in the form of a rectangular pier, one side of which is known as the unloader wharf and the

opposite side as the reloader wharf. These are connected by what is known as the end wharf. The unloader and reloader wharves are approximately 1,000-ft. long and the end wharf about 500-ft. long. The storage space for coal, which is between the two longer wharves, has an area of approximately 815,000 square feet. The berthing capacity is about 2,500-ft. with a depth of about 40-ft. alongside.

The storage area is spanned by two movable steel bridges known as the stocking and reclaiming bridges. These bridges travel the entire length of the coal pile, and by means of travelling buckets traversing the bridges can reach any part of the storage pile.



Dry Dock at Cristobal.

The unloader wharf is equipped with four movable unloaders which travel the entire length of the wharf. These are equipped with 2½-ton buckets with a capacity of 250 tons per hour each. The coal is delivered to tramcars, electrically operated, running on an overhead trestle which circuits the entire plant. These cars hold 10 tons and dump their loads on to the stock pile through hoppers on the unloading and reclaiming bridges. The unloaders are operated by steam, all of the rest of the plant being operated by electricity.

The reloader side of the plant also has four movable machines which can traverse the entire length of the plant. Coal is reclaimed from storage by four bridge diggers, equipped with 5-ton buckets, which deliver coal to the tramcars, which in turn deliver to the reloaders or to any other place desired. The reloaders are fed by endless-belt conveyors which dump into a hopper and thence to the ship.

The end wharf affords support for a wharf bunker of 1,500 tons capacity. This facility supplies tugs and other small craft without necessitating the operation of the entire plant.

OIL BUNKERING.

Following the general policy as outlined by Congress, all fuel-oil tanks, with their loading and unloading facilities, are controlled by the Government. Tank sites and tanks are leased by the Government to private companies, oil being pumped through a central station at the cost of 4 cents per barrel. Ships requiring fuel oil and not having contracts with any oil company should request bids by radio to expedite fuelling.

CRISTOBAL.

At the oil-tank farm at Mount Hope there are 23 tanks with a total working capacity of 1,121,000 barrels. The average amount of fuel oil available is about 600,000 barrels. Fuel oil is obtained from California and South America and is Navy grade "C." The following table shows the number of tanks at the tank farm at Mount Hope, with their capacities and the name of the lessees:—

Name of Lessee.	No. of tanks	Capacity
Fuel Oil:		Barrels
Asiatic Petroleum Storage Co. ...	2	110,000
Arrow Oil Co. ...	2	110,000
Huasteca Petroleum Co. ...	3	165,000
Panama Canal ...	4	207,000
Texas Co. ...	2	110,000
United States Navy ...	3	150,000
United Fruit ...	2	110,000
West India Oil Co. ...	2	110,000
Total fuel oil ...	20	1,072,000
Diesel Oil: Panama Canal ...	1	42,000
Gasoline: Panama Canal ...	1	4,300
Kerosene: Panama Canal ...	1	3,230
Grand total ...	23	1,121,530

Oil is received at the oil wharf. Pipe-line equipment consists of the following: Two 12-in. fuel oil with three heads, one 6-in. Diesel oil with two heads, one 4-in. gasoline with one head, and one 4-in. and 5-in. kerosene with one head. Pier No. 6 has a 12-in. fuel-oil line with six heads, and Pier No. 8 is similarly equipped for bunkering fuel oil. The coaling plant has four 8-in. fuel-oil lines with eight loading heads.

BALBOA.

The oil-tank farm at the Pacific terminus is located near Fort Amador. It contains 24 tanks with a total capacity of approximately 1,021,000 barrels. The average supply of fuel oil kept on hand is approximately 503,000 barrels, and the main source of supply is California. The grade of oil is Navy bunker "C." The following table shows the number of tanks leased by the several companies, together with their capacities:—

Name.	No. of Tanks.	Capacity.
Fuel Oil:		Barrels
Asiatic Petroleum Storage Co. ...	2	135,000
Arrow Oil Co. ...	3	164,000
Panama Canal and United States Shipping Board ...	3	110,000
Union Oil Co. of California ...	2	117,000
United States Navy ...	3	150,000
West India Oil Co. ...	1	64,000
Total fuel oil ...	14	770,000
Diesel Oil:		
Asiatic Petroleum Storage Co. ...	1	55,000
Arrow Oil Co. ...	1	25,000
Union Oil Co. of California ...	3	111,000
West India Oil Co. ...	1	20,000
Total Diesel Oil ...	6	211,000
Gasoline:		
Panama Canal ...	2	7,580
West India Oil Co. ...	1	28,270
Total Gasoline ...	3	35,850
Kerosene: Panama Canal ...	1	5,000
Grand Total ...	24	1,021,000

Oil is received and bunkered at the oil wharf. The pipelines, with their heads, are as follows: Two 10-in. fuel oil with three heads, one 8-in. gasoline with one head, one 6-in. Diesel oil with one head, and one 4-in. kerosene with one head. In addition to this facility, ships can bunker at Docks Nos. 4, 6 and 7.

PORT AND HARBOUR FACILITIES.

PIERS, WHARVES, AND DOCKS, CRISTOBAL.

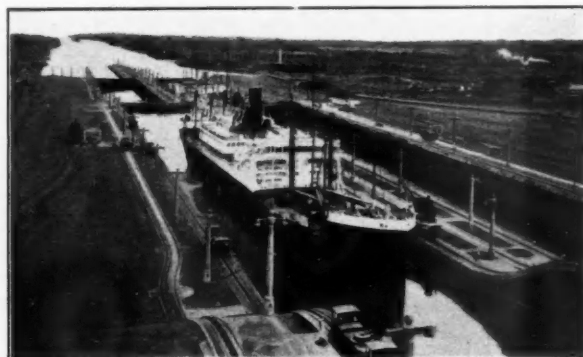
There are nine facilities at Cristobal which are used for the docking of ships. Five of these are of steel and concrete construction, the rest being built of timber. The total berthing capacity of these facilities is about 13,500-ft., of which 13,000-ft. can be used by deep-draft vessels.

Piers Nos. 6, 7 and 8 are constructed of steel and concrete. Each is about 1,000-ft. long and 250-ft. wide, and each has a steel and concrete transit shed covering the greater part of its area. Nos. 9 and 10 are also of modern construction and are equipped with transit sheds. All of these facilities have cargo masts and are amply supplied with equipment for handling cargo. The transit sheds on the piers are used for storage of "in transit" cargo as well as for local freight.

Dock No. 13 is used as a lumber wharf and also in conjunction with the old French dry dock. These two structures are of pile and timber construction.

Dock No. 14 is an oil wharf.

Dock No. 16 is a modern coaling plant.



Gatun Locks.

All of these facilities are owned by the Panama Railroad Co., which operates all of them except Pier No. 6. This pier has been turned over to the Panama Canal. The Panama Railroad has spur connections with every facility in the port.

In the port of Colon, adjacent to Cristobal Harbour, the Panama Railroad owns two wharves and a pier of pile and timber construction. These facilities are utilised only by small coastwise sailing vessels, since the water alongside is of insufficient depth to accommodate deeper-draft ships.

UNDER THE JURISDICTION OF THE GOVERNOR OF THE PANAMA



THE DOCK AND HARBOUR AUTHORITY, M

THE PANAMA CANAL.

(CRISTOBAL & BALBOA)

THE GOVERNOR OF THE PANAMA CANAL.

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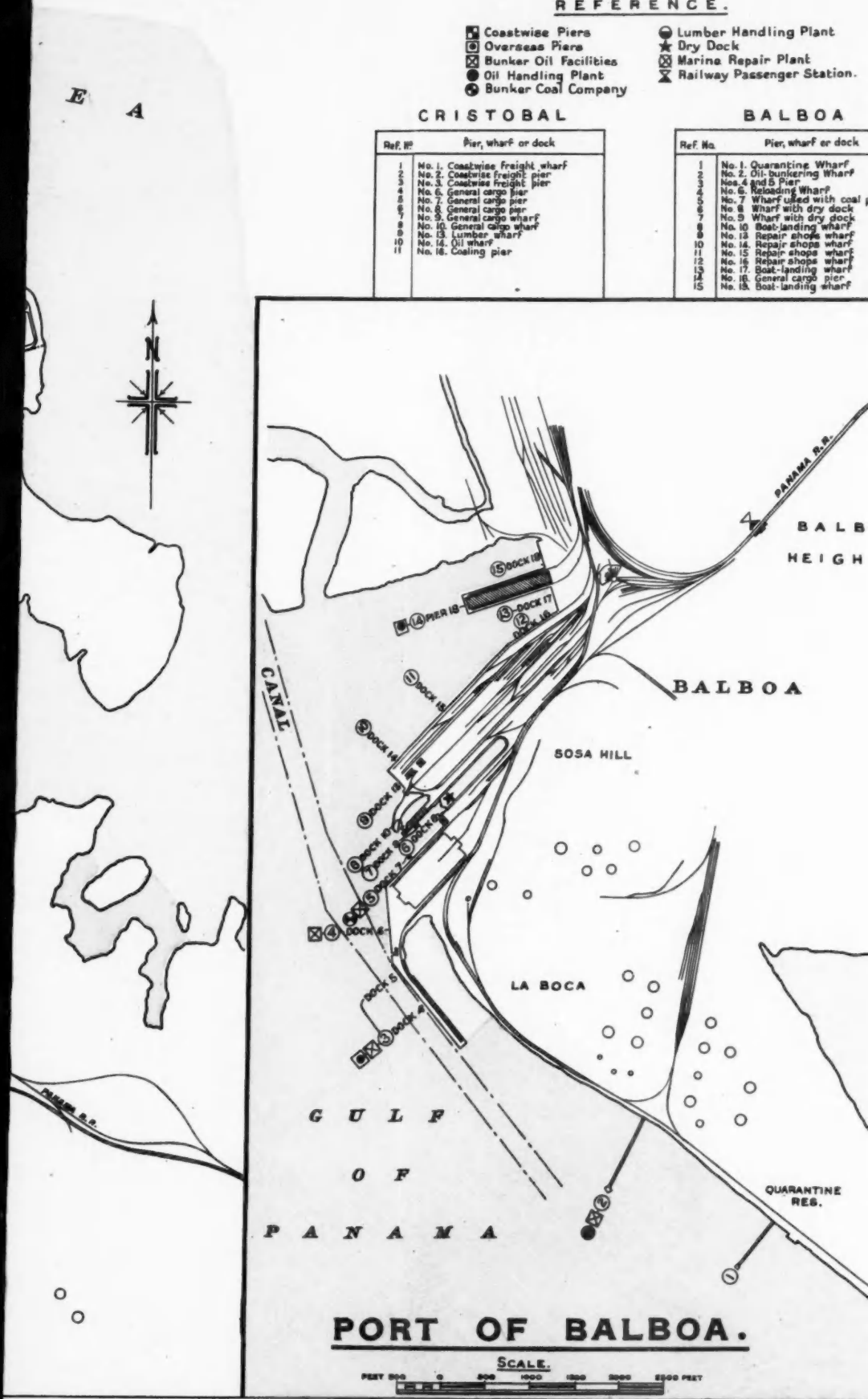
- ☐ Coastwise Piers
- ⊙ Overseas Piers
- ⊗ Bunker Oil Facilities
- ⊙ Oil Handling Plant
- ⊙ Bunker Coal Company
- ⊙ Lumber Handling Plant
- ★ Dry Dock
- ⊗ Marine Repair Plant
- ⊗ Railway Passenger Station

CRISTOBAL

Ref. No.	Pier, wharf or dock
1	No. 1. Coastwise freight wharf
2	No. 2. Coastwise freight pier
3	No. 3. Coastwise freight pier
4	No. 6. General cargo pier
5	No. 7. General cargo pier
6	No. 8. General cargo pier
7	No. 9. General cargo wharf
8	No. 10. General cargo wharf
9	No. 13. Lumber wharf
10	No. 14. Oil wharf
11	No. 16. Coaling pier

BALBOA

Ref. No.	Pier, wharf or dock
1	No. 1. Quarantine Wharf
2	No. 2. Oil-bunkering Wharf
3	No. 4 and 5 Pier
4	No. 6. Reloading Wharf
5	No. 7. Wharf used with coal
6	No. 8. Wharf with dry dock
7	No. 9. Wharf with dry dock
8	No. 10. Boat-landing wharf
9	No. 12. Repair shops wharf
10	No. 14. Repair shops wharf
11	No. 15. Repair shops wharf
12	No. 16. Repair shops wharf
13	No. 17. Boat-landing wharf
14	No. 18. General cargo pier
15	No. 19. Boat-landing wharf

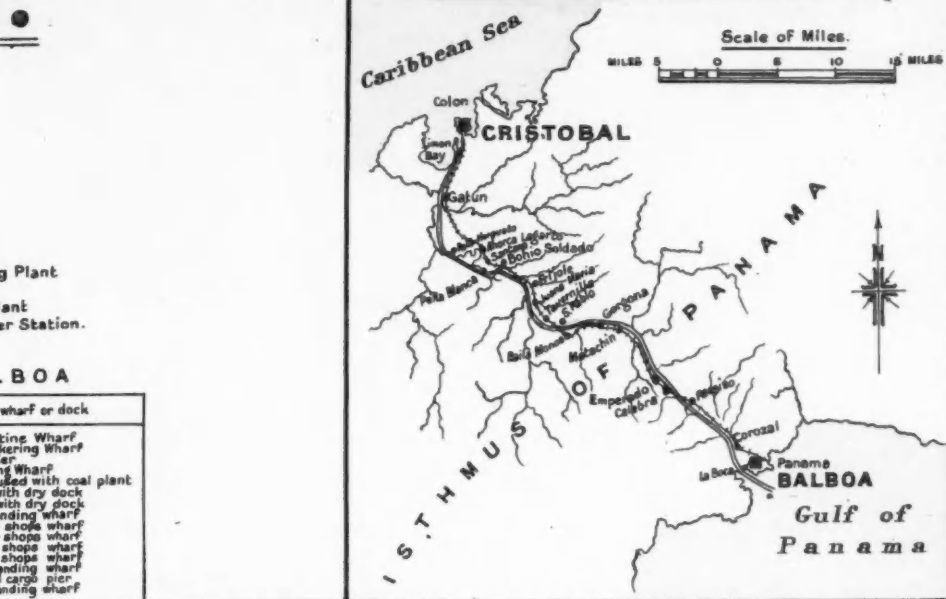


PORT OF BALBOA.



Y, MARCH, 1929.

MAP OF THE CANAL.



THE DOCK AND HARBOUR AUTHORITY, M

OF THE PANAMA CANAL.

(CRISTOBAL & BALBOA)

THE GOVERNOR OF THE PANAMA CANAL.

REFERENCE.

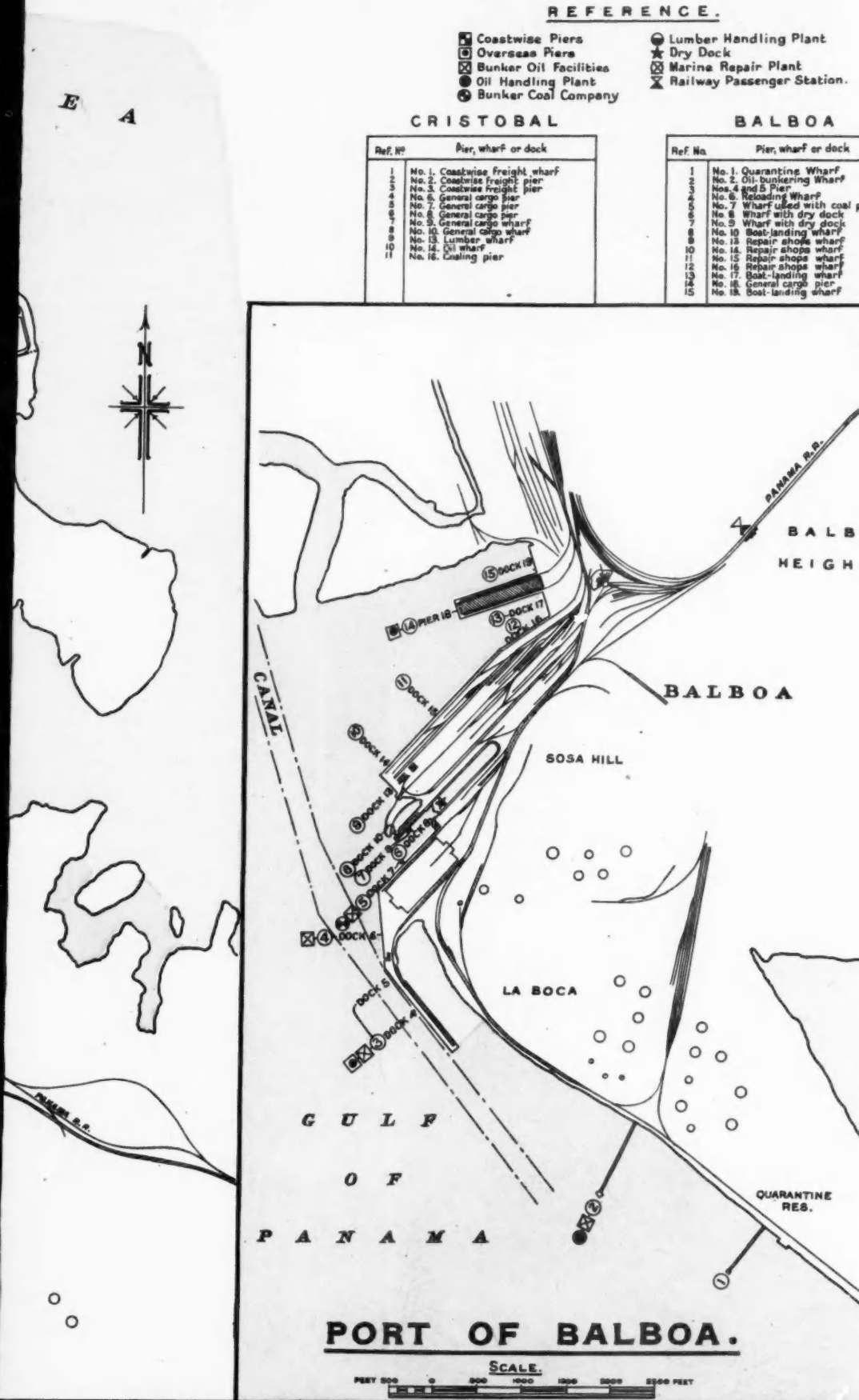
- ① Coastwise Piers
- ② Overseas Piers
- ⊗ Bunker Oil Facilities
- ⊙ Oil Handling Plant
- ⊙ Bunker Coal Company
- ⊙ Lumber Handling Plant
- ★ Dry Dock
- ⊗ Marina Repair Plant
- ⊗ Railway Passenger Station

CRISTOBAL

Ref. No.	Pier, wharf or dock
1	No. 1. Coastwise freight wharf
2	No. 2. Coastwise freight pier
3	No. 3. Coastwise freight pier
4	No. 4. General cargo pier
5	No. 5. General cargo pier
6	No. 6. General cargo pier
7	No. 7. General cargo pier
8	No. 8. General cargo pier
9	No. 9. General cargo pier
10	No. 10. General cargo pier
11	No. 11. Lumber wharf
12	No. 12. Oil wharf
13	No. 13. Coal pier

BALBOA

Ref. No.	Pier, wharf or dock
1	No. 1. Quarantine Wharf
2	No. 2. Oil-bunkering Wharf
3	No. 3. Oil-bunkering Wharf
4	No. 4. Reloading Wharf
5	No. 5. Wharf used with coal
6	No. 6. Wharf with dry dock
7	No. 7. Wharf with dry dock
8	No. 8. Boat-landing wharf
9	No. 9. Repair shops wharf
10	No. 10. Repair shops wharf
11	No. 11. Repair shops wharf
12	No. 12. Repair shops wharf
13	No. 13. Boat-landing wharf
14	No. 14. General cargo pier
15	No. 15. Boat-landing wharf

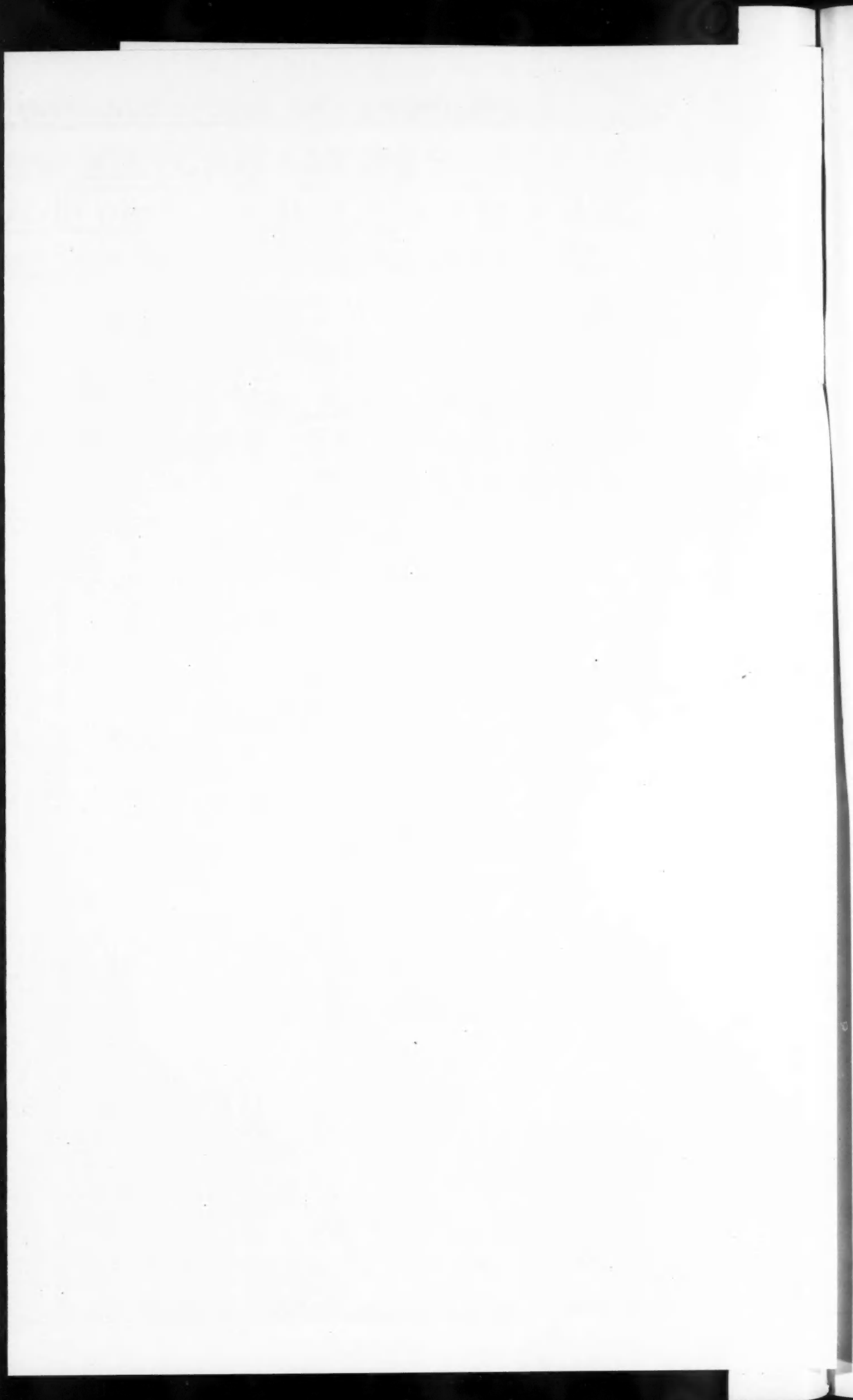


PORT OF BALBOA.

SCALE
FEET 0 500 1000 1500 2000 2500

BOA
wharf or dock
ing Wharf uring Wharf er Wharf ed with coal plant ith dry dock ith dry dock nding wharf shops wharf shops wharf shops wharf nding wharf cargo pier nding wharf

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BALBOA.

There are 15 piers and wharves in the port of Balboa, of which all but two are of steel and concrete construction. The only pier which is used for handling general cargo is Pier No. 18. This pier is of modern construction, with a transit shed covering the greater part of its area. It is equipped with movable cargo booms, a stationary jib boom and other cargo-handling appliances. Docks Nos. 13, 14, 15 and 16 are used in conjunction with the repair shops. Docks Nos. 8 and 9 are used in connection with the graving dock. Dock No. 7 is used for oil bunkering and can be used, if necessary, for bunkering coal since the coaling plant is situated thereon. Dock No. 6 is used for reloading and for bunkering ships with oil. Dock No. 2 is used exclusively for the receipt of petroleum and its products and for bunkering ships.

STORAGE WAREHOUSES.

For information on this subject see "Storage" under "Port Services and Charges."

BULK FREIGHT STORAGE.

Aside from the coaling plants and the oil farms at both ports there are no facilities for bulk freight storage. The commerce of these ports does not require space for such purpose.

DRY DOCKS AND MARINE RAILWAYS.**CRISTOBAL.**

The French, during their operations, built a graving dock at the Atlantic entrance. This dock was taken over by the United States when it purchased the French concession. It is 316-ft. 6-in. long overall, and the width at the entrance is 50-ft. The elevation at the sill is 13-ft. 4-in.

There are no marine railways at either side of the canal.

BALBOA.

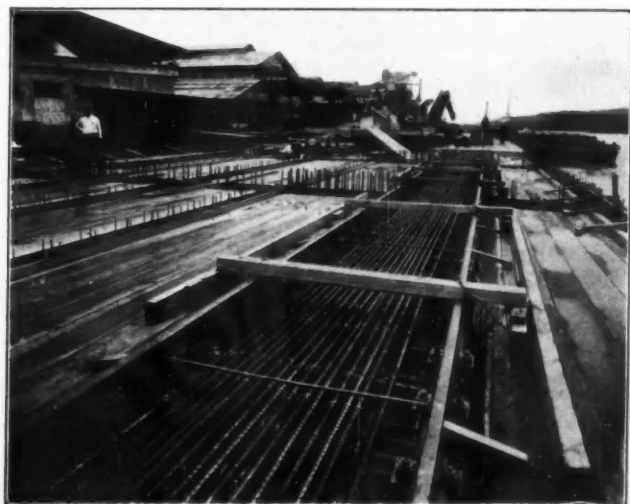
One of the largest dry docks in the world is situated at Balboa. This dock is of concrete construction and is capable of docking the largest commercial vessels in existence. It is 1,000-ft. long by 110-ft. wide, and the depth over the keel blocks at mean high tide is 45-ft.

MARINE REPAIR PLANTS.**BALBOA.**

The principal repair plant of the Panama Canal is located at Balboa. This plant has a repair wharf with about 3,500-ft. of berthing space. The repair shops are centrally located with respect to the repair wharves and to the dry dock, which is adjacent to the plant.

Ample tracks and crane services are provided for handling work between shop and ships. The main metal-working shops (machine, smithery, and boiler shop) are provided with 60-ton overhead travelling cranes, while the foundry has a 25-ton overhead crane.

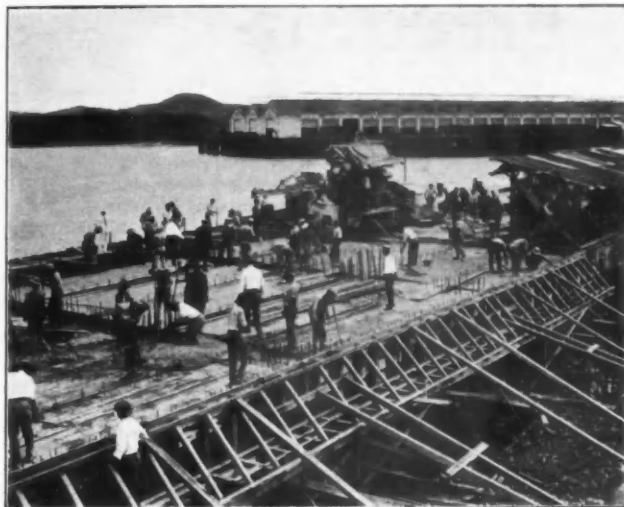
The machine shop, which has a floor area of approximately 68,180 square feet, is equipped with a vertical boring mill and with a lathe capable of working on ship machinery of any size. The smithery is provided with a 500-ton forging press, and billets 24-in. square by 19-ft. long are kept in stock and can be worked in this press. This shop has a floor area of approximately 24,386 square feet. The boiler and fitting shops, whose



Repairing Dock 15 at Balboa.

area is approximately 46,800 square feet, have a set of rolls capable of bending plates three-fourths inch by 30-ft., 1-in. by 24-ft., or 2-in. by 6-ft. The pipe shop, with an area of 17,144 square feet, is outfitted to perform any kind of plumbing, copper, and sheet-metal work. The foundry, which has an area of 37,758 square feet, can make castings of the following sizes: Bronze, brass, or composition, one-fourth pound to

1,000 pounds; iron, one-fourth pound to 26,000 pounds; steel, one-fourth pound to 10,000 pounds. The planing mill and joiner shop, which is outfitted with a 72-in. sawmill, has a floor area of 49,044 square feet. The oxy-acetylene plant is equipped with portable electric welding and oxy-acetylene-cutting outfits. It develops approximately 400 cubic feet of acetylene per hour, 5,000 cubic feet of oxygen, and 10,000 cubic feet of hydrogen per day. This building has an area of 910 square feet.



Repairing Dock 15 at Balboa.

In addition to these shops are the paint shop with an area of approximately 14,064 square feet, a car shop of 61,819 square feet, and a laboratory with 100,000-pound Riehle testing machine. All the shop tools are operated by electricity. The larger tools are provided with industrial motors, and the smaller tools are arranged in groups and driven from counter-shafts. The variable speed tools in the shop are driven from rotary transformers within the shop. All other tools are driven by alternating current, generally at 220 volts.

The stock house of the plant carries a large supply of steel plate in all thicknesses up to and including 2-in. The largest plates are 72-in. by 10-ft. by 2-in. thick. Steel billets in all sizes up to and including 24-in. by 24-in. by 19-ft. are available. Structural shapes are carried as follows: I beams of all sizes up to 27-in.; channel beams, all sizes up to 15-in.; ship channels, all sizes up to 12-in.; and angles of all sizes up to 8 by 8-in. by 1-in.

CRISTOBAL.

The Cristobal plant is much smaller than the one at Balboa and is equipped with a machine shop, smithery, pipe shop, power plant, boiler and outfitting shop, and a woodworking shop. The tools are of smaller capacity than those of the Balboa plant and are intended merely to undertake routine repairs to vessels.

The facilities of the more expensive plant at Balboa are made available for vessels at the Atlantic end of the canal through the exemption from tolls of vessels transiting the canal from Cristobal to Balboa and return for the sole purpose of having repairs made at Balboa.

FLOATING EQUIPMENT.**LIGHTERS AND BARGES.**

The Canal Zone is well equipped with lighters and barges for handling cargo, but as the docking facilities are sufficient to handle the cargo passing through the terminal ports there is little demand for this equipment.

TUGS.

There are two seagoing tugs at Cristobal, namely, the "Porto Bello," which is a single-screw, steam-propelled vessel, generating 150-h.p.; and the "Tavernilla," a single-screw, steam-propelled vessel, generating 1,200-h.p. The former tug is equipped with a towing machine. At the Pacific entrance are located the "Gorgona," a sister ship of the "Tavernilla," and the "Cocoli." The latter is a single-screw vessel, steam propelled, generating 206-h.p. It is equipped with a towing machine and capstan.

The "Engineer," at the present time allotted to the light-house division, is also available for towing. This vessel has a single screw and is propelled by steam. It is capable of generating 490-h.p. In addition to these tugs, two Diesel electric tugs are under construction at the Balboa docks. These will be 125-ft. long and will have 28-ft. beams and will be able to generate 750 shaft h.p. In addition to these larger tugs the "Coco Solo," the "Birdena," the "Siri," and "No. 26" are also available.

FLOATING CRANES.

For heavy lift work the Panama Canal is equipped with two 250-ton floating cranes, the "Hercules" and the "Ajax." These cranes are equipped with main and auxiliary hoists. The capacities of the main hoists are 250 tons at not less than 22-ft. radius and capable of lowering 30-ft. below the water 150 tons at not less than a 62-ft. radius, lowering 100-ft. below the water. The capacities of the auxiliary hoists are 15 tons. The jibs on each crane are 143-ft. long, and when elevated to the highest angle reach 206-ft. above the deck.

SALVAGE.

The salvage equipment at the Panama Canal consists of the United States "Favorite," of 1,223 gross tons. It is a single-screw, steam-propelled vessel, generating 2,500-h.p., and having a speed of 12 knots. It is equipped with two cranes, one forward and one aft. The forward crane has a capacity of 25 tons and the after crane a capacity of 50 tons. To work in conjunction with this vessel there are two flat-bottomed, wooden, diving barges 20-ft. long, 8-ft. wide and 18-ft. deep, and one steel barge 114-ft. long, 29-ft. wide and 10-ft. deep, equipped with a wooden A frame, having a capacity of 15 tons. Other equipment consists of four centrifugal pumps, each having a capacity of 12,000 gallons per minute; four submersible electric 4-in. pumps; two submersible electric 6-in. pumps, and one submersible electric 8-in. pump; three diving helmets, four complete diving suits and three diving air pumps.

COMMUNICATIONS.

RAILROADS.

The Panama Railroad, which was built by American capital in 1849, traverses the Isthmus of Panama connecting the cities of Colon and Cristobal on the Atlantic side with the cities of Panama and Balboa on the Pacific side. It is owned by the United States Government, but is operated as a private corporation, under the laws of New York. The railroad is

1922			1923			1924			1925			1926		
Atlantic to Pacific	Pacific to Atlantic	Total	Atlantic to Pacific	Pacific to Atlantic	Total	Atlantic to Pacific	Pacific to Atlantic	Total	Atlantic to Pacific	Pacific to Atlantic	Total	Atlantic to Pacific	Pacific to Atlantic	Total
5,495,934	5,388,896	10,884,830	7,086,259	12,481,614	19,567,873	7,860,100	19,134,610	26,994,710	7,398,470	16,560,439	23,958,909	8,037,096	18,000,351	26,037,447

administered by the Governor of the Canal Zone and a board of directors, thirteen in number. It is used primarily to carry canal supplies across the Isthmus, and in no way is it permitted to compete with the canal for private traffic. The rolling stock of the line in operation during 1926 consisted of 17 locomotives, 907 freight cars, 62 passenger cars, and 5 miscellaneous cars.

For the year ending June 30th, 1926, the Panama Railroad had a gross revenue of \$814,491 from freight and \$542,142 from passengers, including baggage, express, mail and treasure. The total freight carried was 289,967 tons, and the total ton mileage was 10,088,961.

In addition to the railroad the Panama Railroad Co. operates a regular line of steamers from New York to the Canal Zone. It also owns and operates the terminals at both Cristobal and Balboa and the fuelling plants at both places.

STEAMSHIP SERVICES.

Steamship lines passing through the canal or using its ports as termini offer services to practically every important trade area in the world. Since the canal is the connecting link in the intercoastal trade of the United States, American lines naturally are more numerous than those of any other flag, there being more than 30 lines. The British lines are second and the French third in number.

CABLES.

Communication from the Canal Zone by cable is obtainable through the lines of the All America Cables. This company maintains direct service to New York via Fishermans Point, Cuba, and to Buenos Aires via the west coast of South America. Practically all points in Europe, South and Central America can be reached directly or indirectly through the lines of this company.

RADIO.

The naval radio system is used for Government communication with the United States and for messages to or from ships on both Government and commercial business. The only land areas to which it handles commercial messages are those sections of the Republic of Panama contiguous to the outlying stations at La Palama and Puerto Obaldia, stations in Colombia reached through the radio stations at Cartagena, the radio stations in the Caribbean operated by the United Fruit Co., and the Government stations at Bluefields, Nicaragua, and British Honduras. The naval station will also answer messages

in connection with the United Fruit Co.'s station at Bocas del Toro, Republic of Panama, and Port Limon, Costa Rica. The wave-lengths on which the navy station at Balboa operates are 600, 2,100, 2,254, and 6,518 metres. The Bocas del Toro station of the United Fruit Co. operates on 1,880, 2,910 and 3,750 metre wave-lengths.

COMMERCE.

CANAL TRAFFIC

Traffic passing through the Panama Canal has exceeded greatly the estimates made when the canal was opened in 1914. Since 1922 commerce has increased from 10,884,830 tons to 26,037,447 tons, or about two and one-half times. The earlier increases were due to the large shipments of oil from the Pacific coast to the Atlantic coast of the United States, and it was feared that a decline of the western oil fields would correspondingly decrease the tonnage using the canal, but such fears have proved to be unfounded. Other commodities, such as lumber, grain and ores, have increased to meet the deficiency caused by the lessening of the oil movement.

In 1922 the tonnage of cargo passing from Atlantic to Pacific, and vice versa, was practically equal, but during the next year and for every year subsequent the traffic from Pacific to Atlantic has increased much more than has the reverse movement. This has been due to the large quantities of oil, grain, lumber, nitrates and ore moving from the West to the principal consuming centres on the eastern coast of the United States and in Europe.

General merchandise and manufactured iron and steel products comprised about half of the westbound traffic during 1926. Other important commodities in the east-west movement were refined oils, cotton, coal and coke, sulphur, machinery and automobiles.

The following table, compiled from data printed in the Panama Canal Record, shows the traffic passing through the canal for the fiscal years 1922 to 1926, inclusive:—

TRAFFIC OF THE TERMINAL PORTS.

CRISTOBAL.

The total traffic moving between the port of Cristobal and continental United States ports during the fiscal year ended June 30th, 1926, was 1,033,909 cargo tons, of which 883,759 tons were imports and 150,150 tons exports. Import traffic received from Atlantic and Gulf coasts amounted to 711,913 tons, which was divided into 483,845 tons from Atlantic ports and 228,068 from Gulf ports. Coal from Norfolk comprised 330,993 tons of this import traffic. New York shipped 133,004 tons, composed principally of provisions, cotton cloth, cement, and metals and manufactures. Houston shipped 135,372 tons of petroleum; and New Orleans shipped 76,491 tons, made up principally of petroleum, lumber and grain. The Pacific coast ports shipped 171,846 tons during the same year, of which 163,266 tons of petroleum from Los Angeles was the largest item.

Exports to the United States were divided into 134,399 tons to Atlantic and Gulf coast ports and 15,751 tons to Pacific coast ports. The bulk of traffic to the Atlantic coast was exported to New York, Mobile, and New Orleans. New York received 90,578 tons, Mobile 26,803 tons, and New Orleans 13,843 tons. Copper, amounting to 47,435 tons, was the largest item shipped to New York, while coffee and bananas were next in importance. Of the tonnage received by Mobile 26,800 tons were bananas, while the same commodity constituted over half of the exports to New Orleans.

Of the 15,751 tons exported to Pacific coast ports, 9,062 tons were shipped to San Francisco and 6,586 tons to Los Angeles. Coffee to the amount of 6,706 tons constituted the largest part of the San Francisco shipment, and 5,490 tons of bananas comprised the bulk of traffic destined to Los Angeles.

BALBOA.

As at Cristobal the largest portion of Balboa's traffic consisted of imports from the United States. This traffic amounted to 420,384 cargo tons during the fiscal year ended June 30th, 1926. Practically all of this consisted of petroleum from Los Angeles, San Luis Obispo, and San Francisco. The principal items of imports from the Atlantic and Gulf coasts were 8,619 tons of coal from Norfolk and 7,000 tons of petroleum from New Orleans. Exports to the United States amounted to but 8,444 tons, of which 7,134 tons were shipped to San Francisco. Of this latter amount 6,896 tons were scrap metal.

The following table shows the number and net tonnage of vessels, by flags, transiting the canal for a period of twelve years, from 1915-1926, inclusive:—

	1915		1916		1917		1918		1919		1920		1921	
	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage
United States ...	459	1,700,145	213	652,989	404	1,239,492	567	1,704,040	784	2,257,342	1,129	3,791,088	1,210	4,861,761
British ...	465	1,630,838	358	1,161,097	780	2,663,250	702	2,529,203	607	1,915,744	753	2,760,188	972	3,978,329
Norwegian ...	42	130,776	44	172,459	145	490,534	296	876,024	128	497,555	106	397,632	140	548,227
Japanese ...	6	24,897	24	81,818	72	291,500	54	233,814	87	341,064	118	515,243	136	613,245
Chilean ...	33	94,638	33	91,243	99	265,210	96	254,841	93	253,561	79	212,000	63	159,727
Danish ...	24	92,537	18	68,011	43	163,882	100	272,946	79	213,534	9	32,221	60	236,512
Dutch ...	7	21,075	15	39,642	74	260,500	48	197,627	19	88,299	29	152,535	50	248,801
Peruvian ...	4	9,403	30	74,429	36	218,593	83	203,958	64	166,956	75	191,689	60	157,495
French ...	3	10,708	1	4,343	9	38,889	52	147,805	104	253,774	60	114,664	44	155,889
German ...	—	—	—	—	—	—	—	—	—	—	17	52,755	19	67,334
Swedish ...	17	50,824	13	41,537	18	69,202	26	80,191	27	95,684	19	76,825	25	113,661
Spanish ...	—	—	—	—	20	49,124	11	21,469	5	11,066	41	106,651	44	117,400
Italian ...	2	4,158	1	3,861	2	6,430	4	17,218	—	—	26	98,692	25	102,783
Miscellaneous ...	11	22,583	8	4,733	51	41,951	30	21,937	27	30,411	17	43,861	44	54,712
Total ...	1,075	3,792,572	758	2,396,162	1,803	5,798,557	2,069	6,574,073	2,024	6,124,990	2,478	8,516,014	2,892	11,415,876

	1922		1923		1924		1925		1926		Total	
	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage	Number of Ships	Net Tonnage
United States ...	1,095	4,971,509	1,994	10,208,536	2,947	15,806,899	2,326	12,271,387	2,432	12,565,255	15,560	72,030,443
British ...	935	3,795,526	1,065	4,892,338	1,265	6,097,611	1,211	5,949,391	1,423	7,039,542	10,586	44,413,052
Norwegian ...	113	385,007	147	597,359	136	546,633	192	672,663	309	987,040	1,798	6,301,909
Japanese ...	189	872,466	163	753,219	171	815,468	172	823,869	131	619,028	1,323	6,020,631
Chilean ...	53	150,398	62	201,411	47	176,472	29	129,183	26	121,901	715	2,110,585
Danish ...	53	227,473	65	240,053	65	245,929	42	160,299	63	234,753	621	2,188,150
Dutch ...	66	293,428	109	510,970	102	551,761	102	531,251	93	530,662	714	3,426,541
Peruvian ...	60	161,930	80	216,829	70	189,046	73	188,784	64	149,162	749	1,933,274
French ...	51	190,171	56	252,333	83	386,640	105	489,806	90	421,752	658	2,466,769
German ...	37	122,893	90	336,149	150	660,156	163	723,067	163	726,340	639	2,688,694
Swedish ...	35	124,446	31	130,361	39	161,993	49	225,593	84	369,272	383	1,539,589
Spanish ...	9	27,264	14	41,201	45	172,572	43	159,579	31	121,461	263	830,787
Italian ...	20	73,393	29	117,782	43	164,448	57	241,054	90	379,990	299	1,309,809
Miscellaneous ...	20	21,555	62	107,245	67	173,250	109	289,225	203	478,443	649	1,289,906
Total ...	2,736	11,417,459	3,967	18,605,786	5,230	26,148,878	4,673	22,855,151	5,202	24,774,591	34,907	148,450,139

RECENT IMPROVEMENTS.

The dock and harbour facilities have been sufficient, and no important changes or additions in equipment along this line were found necessary. An outline of the most important improvements and new construction in connection with the general operation of the Panama Canal, commenced or continued in the fiscal year ending June 30th, 1928, is given below:—

Alhajuela Dam.—Need of more water during the dry season has resulted in the commencement of the Alhajuela Dam project across the upper Chagres River, which is the most important constructive feature in the present work of the Canal administration and development. The first work is to be the construction of a highway to Alhajuela from Summit, construction of telephone and power transmission lines, completion of topographical survey of the reservoir area, and the examination by diamond drill borings of the several dam sites. It is assumed that five years will be required to complete this project.

Dredging Entrances and Channel.—Maintenance and improvement work was continued throughout the year in dredging the Atlantic entrance, Gaillard cut, Pacific entrance, and Cristobal and Balboa harbours and terminals.

Deepening of the Pacific entrance channel from Miraflores Locks to the sea buoys and Balboa harbour, from 45-ft. to 50-ft. below mean sea level was continued during 1928.

Widening the channel at Lirio curve for a length of three-quarters of a mile by excavating from the west bank of the Cut, was continued, in order that all classes of vessels may pass this sharp turn with ease and a better range of visibility.

Widening of channel fronting West Culebra slide was commenced in 1928.

Dock 15 at Balboa.—Repairs were made to Dock 15, the old caissons being replaced with new ones, which were filled with concrete.

Pier 8, Cristobal.—A 50-ton capacity stiff-legged derrick was erected on Pier 8.

Administration Building, Cristobal.—Work was commenced on this new office building, which is designed to house all the offices of Canal administration on the Atlantic side.

Warehouse, Mount Hope.—New reinforced concrete warehouse to be used by Commissary Division is advancing towards completion. It will contain 180,000 square feet of floor space on three floors.

Diesel-electric Tugboats.—Two 125-ft. tugs, the "Chagres" and "Trinidad," were built by Mechanical Division and placed in service for channel and harbour work, but available for emergency sea duty when necessary.

Bridge Across Miraflores Channel.—A bridge was built across Miraflores Spillway discharge channel about 200 yards below the dam, to carry both a track from the Panama Railroad and a highway to Miraflores Locks. The bridge is a concrete trestle 530-ft. long, carrying a 16-ft. concrete roadway for

vehicular traffic with the 5-ft. railroad track carried along the centre-line decking.

Oil Tank, Balboa.—One fuel oil tank of 80,000 barrels capacity and one gasoline tank of 20,000 barrels were erected by commercial interests at Balboa. The total storage capacity at both terminals for fuel and Diesel oil is now 2,361,040 barrels.

Wellington Harbour Board, N.Z.

The following is a return showing vessels discharged at the Port of Wellington at a rate exceeding 1,000 tons per day from October, 1927, until September, 1928.

Vessel	Where From	Tons Discharged	Working Time Days Hrs.	Average Tons Per Day
Port Gisborne ...	London ...	2,870	2 4	1,215
Kurow ...	Auckland ...	1,510	1 3	1,162
Katoa ...	Portland ...	1,467	1 2½	1,215
Queen Eleanor ...	Montreal ...	1,828	1 5	1,293
Port Hardy ...	London ...	3,452	3 5	1,015
Tahiti ...	San Francisco ...	2,468	2 0	1,234
Kamona ...	Portland ...	1,682	1 7½	1,037
Waioapu ...	Los Angeles ...	2,668	2 6	1,055
Rotorua ...	London ...	4,317	4 0	1,079
Kaponga ...	Portland ...	1,471	1 4	1,051
Makura ...	San Francisco ...	1,893	1 7½	1,202
Tahiti ...	San Francisco ...	1,535	1 0	1,535
Katoa ...	Portland ...	1,028	1 0	1,028
Queen Eleanor ...	New York ...	2,515	2 4½	1,090
Kaiwarra ...	Portland ...	1,577	1 4½	1,010
Port Curtis ...	New York ...	2,814	2 4	1,236
Tahiti ...	San Francisco ...	2,344	2 0	1,172
Kaitangata ...	Portland ...	1,554	1 2½	1,237
Kaimanawa ...	Portland ...	1,065	1 0	1,065
Pipiriki ...	Montreal ...	3,945	3 4	1,189
Kaitiki ...	Portland ...	2,009	2 0	1,004
Canadian Highlander ...	Montreal ...	2,950	2 5	1,238
Port Huon ...	London ...	3,665	2 4	1,598
Borderer ...	New York ...	2,811	2 2	1,363
Port Bowen ...	New York ...	2,813	2 0	1,406
Mahana ...	London ...	4,867	4 6	1,077
Remuera ...	London ...	4,142	4 0	1,035
Canadian Britisher ...	Montreal ...	2,806	2 0	1,403
Papanui ...	London ...	3,962	3 6	1,132
Corinthic ...	London ...	4,319	4 0	1,079
City of Batavia ...	New York ...	3,196	2 4	1,294
Kaimanawa ...	Portland ...	1,834	1 4	1,226
Canadian Transporter ...	Montreal ...	3,041	2 6	1,169
Westmoreland ...	London ...	4,244	3 4	1,231
Maunganui ...	San Francisco ...	1,924	1 7½	1,204
Waioapu ...	Los Angeles ...	2,450	2 1	1,172
Hathkula ...	Calcutta ...	1,645	1 6	1,032

The cargoes discharged at this Port are of a mixed character and in many cases comprise iron bars and other rough cargo, so the averages in question can be taken as relating to the discharge of general cargoes of all classes. The Board supplies for the discharge of cargoes, hydraulic discharging cranes, hydraulic and electric interior cranes for lifting cargo, and petrol and electric tractors are used in the transfer of transhipment goods.

Schemes Affecting the River Humber.

All has not gone well with the proposals of the Hull Corporation to construct a new pier and landing stage at a cost of £100,000 or more to provide better accommodation for the ferry traffic across the Humber between Hull and New Holland on the Lincolnshire side. Reports have been prepared by the engineer and solicitor to the Humber Conservancy Board concerning the proposals embodied in the Corporation's Omnibus Bill and these have been considered by the Parliamentary Committee.

The committee reported that they had given exhaustive consideration to the Bill and were of the decided opinion that a landing stage projecting a distance of 140-ft. further into the river than the existing Victoria Pier (and possibly even 60-ft. more as the limit of deviation shown on the deposited plans would permit) would render the approach to the Old Harbour (the entrance to the River Hull) much more difficult than at present, and that strings of vessels in tow of tugs would foul the eastern dolphin. No less objectionable was the Bill itself, the report continued, from the point of view of the Board. It gave no indication whether the structures in the river would be of open-pile or solid work; it prescribed a period of no less than seven years for the completion of the works, a time disproportionate to their extent and nature; and the standard clauses applicable to the Conservancy Board in respect of works sanctioned on the Humber by Parliament was almost entirely omitted. The Hull River Craft and Lighter Owners' Association had written stating that the proposed landing stage would be a serious danger to navigation and cause silting to the detriment of the entrance to the Old Harbour and to the traffic using it; and that the Hull Fishing Vessel Owners' Association had expressed the opinion that the stage would be a serious menace to river navigation in thick or hazy weather. In moving the adoption of the report of the committee at the January meeting of the Conservancy Board, the Chairman (Mr. J. H. Fisher, J.P.), said that the proposals had been rejected by the town's meeting. He did not know whether they would be proceeded with; personally he hoped they would not. As a precaution the Conservancy have presented a petition to Parliament opposing the scheme.

With reference to the Grimsby Dock Bill the Conservancy Board have decided to apply for the insertion of a clause for the protection of the Board's interests and failing its concession will petition against the Bill. It was reported that the Parliamentary Committee of the Conservancy Board had considered the engineer's reports, etc., and that they found that the proposals were variations of those sanctioned by the Great Central Railway (Grimsby Fish Dock) Act, 1912, under which the London and North-Eastern Railway Company in 1925 had purchased from the Conservancy Board and the Board of Trade that part of the Crown foreshore which would have been occupied had the 1912 proposals been carried out. The new Bill, in the opinion of the committee, must be opposed by the Conservancy Board on the same grounds as in 1912, the standard clauses applicable to the Board in respect of works sanctioned on the Humber by Parliament being entirely omitted notwithstanding that the clauses were conceded by the promoters of the 1912 Bill. The Board have agreed to sell 10.6 acres of Crown foreshore to the Cleethorpes (Lincolnshire) Urban Council at £200 per acre instead of £600 hitherto recommended by the sub-committee for the purpose of their proposed reclamation scheme.

The Aire and Calder Navigation are about to make a commencement with the construction of the projected training walls in the River Trent. This is part of a scheme designed to improve the flow in the navigable channel at the confluence of the Trent and the Ouse and it is expected that when the entire work sanctioned is completed it will be of great benefit to the Port of Goole.

The East Riding County Council have passed a resolution calling the attention of the Minister of Agriculture and Fisheries to the large area of foreshore, approximately 9,000 acres, between Sunk Island and Spurn Point in the Humber which could be reclaimed and made into rich agricultural land. Alderman Oberenton-Brown, who put forward the proposal as a means of providing useful work for the unemployed, said that a large portion had already been reclaimed from the river and only wanted heightening to bring it into cultivation. He added that there were no engineering difficulties in the way and that he thought there would be no objection raised by the Humber Conservancy Board. The land would, of course, become the property of the Crown as was the case with Sunk Island some years ago.

The Bridlington (East Yorkshire) Harbour Board have approved a scheme for improvements at the harbour estimated to cost £12,000, including £4,000 for dredging purposes. The scheme also provides for the erection of a new jetty and the provision of a fresh water supply on the South Pier. Application is to be made to the Treasury for a grant of £8,000 towards the improvements, the carrying out of which will absorb at least some of the unemployed, of which Bridlington has a very large percentage. The harbour at Bridlington has

for a long time stood in need of the works now projected to give further accommodation for the coasting and fishing craft and for the pleasure yachts which visit it in the summer months.

The coal export trade at the Humber ports, all of which are admirably equipped for the expeditious loading of coal, would appear to be looking up. The total exported from Hull, Grimsby, Immingham and Goole in 1928, according to the Board of Trade Returns, was 3,785,697 tons against 2,363,350 tons in 1927—an increase of 1,422,347 tons, equal to 60.15 per cent. In 1926 the strike year, the total was below a million tons, and in 1925, was 3,708,872 tons, or only slightly less than last year. In addition to the above the shipments of coal as bunkers was around 2,400,000 tons, or at approximately the same level as in 1927. But satisfactory as these figures may seem, the combined total is less than 50 per cent. of that of 1913, so that the Humber has still a long way to go before it can be said to have regained its old position, or a fair share of the country's export trade in coal. The Humber ports working at only a normal rate have facilities in the way of sidings, belt conveyors, hoists, etc., for the shipment of twenty million tons per annum. The Yorkshire and Midlands Coal Marketing Scheme now in operation is acting as a stimulus to the delivery of markets abroad, but it is slow uphill work.

Wireless Direction Finding in the Antarctic.

Captain Byrd's Report.

The value of the wireless direction finder as an aid to navigation on all the seven seas is fully recognised to-day, but the fact is not usually appreciated that in some parts of the world the wireless direction finder provides the only reliable means of taking relative bearings.

Observations previously made at the Poles had shown that as the magnetic North and South were approached the ordinary compass became highly erratic, which, on many occasions, has proved a considerable obstacle to exploring parties. Until the science of wireless direction finding attained its present pitch of practical perfection there was no means of obviating the difficulty of obtaining bearings when visibility was bad or doubtful. With this instrument, however, modern explorers are secured against the great dangers of getting lost as their ships approach the Poles.

Captain Byrd, whose scientific expedition in the Antarctic with an aeroplane and the two base ships "City of New York" and the "Eleanor Bolling," has penetrated far into the Antarctic, has in a recent report made special mention of the value of his wireless direction finder. His report is as follows:

"Through the aid of radio direction finding equipment, with which both of the expedition ships are equipped, Captain Brown picked up the whaling steamer 'C. A. Larsen' at a time when all the regular compasses on both the 'City of New York' and the 'Eleanor Bolling' were rendered completely useless because of the proximity of the magnetic Pole."

Captain Byrd has also found his wireless telephone equipment of great value during his present expedition, and in recent years wireless telephony has played an important part in commercial as well as scientific enterprises in the far South. A number of Antarctic whalers have been equipped with Marconi $\frac{1}{2}$ -k.w. telephone sets, with which they have on occasions been heard over distances of more than 2,000 miles. Normally, communication is maintained between whalers and the factory ships and the whaling station at St. Georgia up to distances of 700 and 750 miles. A number of Marconi direction finders have been fitted to these craft and have been found invaluable in assisting the navigators to return quickly to the base with their catch, and, in emergencies, to steer direct to other members of the fleet.

Before the advent of wireless in Southern waters the movement of whalers from the Mother Ship frequently had to be considerably restricted owing to the unreliability of compass bearings, and even so it would sometimes be found that one whaler would discover more whales than it could deal with, while others were searching in vain.

Marconi wireless telephones and direction finders have obviated both these difficulties.

NEW ORLEANS GRAIN EXPORTS, JANUARY, 1929.

The public grain elevators of the New Orleans Port Commission in January, 1929, delivered to steamships for export 4,559,982 bushels of grain. This movement consisted of 4,115,722 bushels of corn, 219,510 of wheat, 212,218 of barley, 10,957 of oats, and 1,575 of rye. This grain is received at New Orleans by rail and river, and for discharging river barges the Port Commission operate two marine legs, each with a transfer capacity of 15,000 bushels an hour.

The Port of New Orleans.

NEW ORLEANS SHIPPING FOR THE CALENDAR YEAR 1928.

During the calendar year 1928, 3,009 deep-sea vessels of 11,869,148 gross register tons arrived in the Port of New Orleans, according to the records of the Port Commission. This is an increase from 2,938 vessels of 10,994,618 gross tons in 1927. Departures for the year numbered 3,016, as compared with 2,934 in the previous year. (Tonnage of departing vessels is not recorded by the Port Commission). These figures are exclusive of shipping which passed through the harbour for landings outside the port limits.

Vessels arriving in the port consisted of 1,383 with general cargo for New Orleans, 629 with fruit and general cargo, 141 with fruit only, 159 with petroleum only, 405 in ballast, and 290 with freight in transit. Of the departures there were 2,212 with general freight, 65 with petroleum only, 611 in ballast, and 128 with transit freight.

THE RIVER TRADE.

There was a similar increase of traffic in the river trade of the port. Arrivals in this trade during the calendar year were 3,107 vessels of 1,195,976 tons, an increase from 2,652 vessels of 1,031,435 tons. (The record is of vessels of 25 tons and over). The movement of barges in the service of the Inland Waterways Corporation amounted to 1,161 vessels of 795,863 tons, as compared with 1,047 vessels of 743,355 tons in 1927.

INNER HARBOUR-NAVIGATION CANAL.

Traffic through the Inner Harbour-Navigation Canal, which connects the Mississippi River with Lake Pontchartrain, also increased greatly, amounting to 10,470 vessels of all classes, which aggregated 4,288,497 register tons, as compared with 9,577 vessels of 3,680,356 tons in 1927. The movement in 1926 was 7,774 vessels of 3,153,326 tons. These figures include traffic in both directions, and include ocean-going steamships which berthed at the commercial or industrial wharves, intra-coastal tugs and barges, and commercial and pleasure craft of all kinds passing between lake and river.

RECORD CARGO OF NEWSPRINT PAPER.

The steamship "Corner Brook" has just discharged at New Orleans over the public wharves a cargo of 10,156,003 pounds, or over 5,078 net tons, of newsprint paper, the largest cargo of this character ever received at New Orleans, and a cargo believed to constitute a record in its class. The "Corner Brook" arrived at New Orleans on January 22nd from Cornerbrook, Newfoundland, where she received her cargo. There were 10,917 rolls of the paper, of which 8,971 were consigned to New Orleans newspapers and 1,946 for transshipment by barge line to Memphis.

This cargo was equal to the average month's receipts of import newsprint at New Orleans. Large quantities of this commodity are received regularly for local consumption and for shipment by rail or barge line to interior points in the south-west or in various sections of the Mississippi Valley.

NEW ORLEANS COFFEE IMPORTS IN 1928.

Coffee imports through the port of New Orleans in the calendar year 1928 were 2,994,003 bags, according to the annual recapitulation of the Green Coffee Association of New Orleans. Of this total, 2,597,023 bags were Brazilian coffees—1,395,168 bags consigned to local importers, and 1,201,855 consigned to importers of interior cities. The remainder, 396,980 bags, were of mild coffee from the tropics. These figures do not include consignments from Africa and other occasional sources.

The coffees imported from Brazil were: 1,911,670 bags from Santos, 260,779 from Rio, 418,926 from Victoria, and 5,648 from Parana.

Mild coffees imported were: 169,006 bags from Columbia, 62,276 from Guatemala, 113,685 from Mexico, 13,171 from Honduras, 20,075 from Java, 8,689 from Maracaibo, 8,143 from Nicaragua, 652 from Salvador, and 1,283 from Venezuela.

The coffee trade of New Orleans has reached such proportions that the Port Commissioners have constructed a special green coffee terminal at Poydras Street at a cost of nearly \$2,000,000, a two-storey steel and concrete structure specially designed for the discharge, segregation and handling of import coffee between ships and warehouses.

Brazil coffees weigh 132 pounds to the bag, mild coffees 150 pounds; therefore the imports of 2,994,003 bags of coffee in 1928 would aggregate 406,314,036 pounds, which would, conservatively, supply the nation with 12,189,421,080 cups of drip coffee.

JANUARY SHOWS BIG GAINS IN SHIPPING AT NEW ORLEANS.

The steady increase of shipping and freight movements in New Orleans Harbour received emphasis in January, 1929, when 276 deep-sea vessels of 1,079,586 gross register tons entered the port in foreign, coastwise, and inter-coastal services. This is an increase of 17 vessels and of 126,760 gross tons, as compared with the record for January, 1928. It is an increase of 58 vessels and of 238,017 tons as compared with January of

1927, an increase of approximately 25 per cent. for the first month of the year within a period of two years.

Departures showed an even greater increase, 264 vessels in January, 1929, as compared with 242 in January, 1928—an increase of 22 vessels. The port commission, which issues these figures, does not make record of tonnage of departing vessels.

General freight moving over the public wharves amounted to 395,226 tons, or 57,392 tons more than in January, 1928. This is in addition to 40,658 tons of ore, etc., discharged through the public bulk commodity handling plant and approximately 4,500,00 bushels of grain handled for export through the public grain elevator. Likewise, it does not include freight passing through private terminals. (Approximately 20 per cent. of New Orleans shipping in January discharged or loaded at private wharves). The business of the public bulk commodity handling plant, which received 32,921 tons of aluminum ore, was 20,000 tons less than its record month of January, 1928, but exports through the public grain elevator were more than 3,000,000 bushels greater than those for the previous January.

The following is a summary of shipping at New Orleans for January, 1929:—

Flag.	No. of vessels.	Gross tonnage.
American	144	619,199
British	31	141,924
Brazilian	2	9,298
Belgian	1	4,438
Danish	9	27,760
Dutch	4	22,737
French	3	17,649
German	4	17,444
Greek	1	4,861
Honduran	36	103,590
Italian	6	35,036
Japanese	1	7,267
Nicaraguan	3	4,715
Norwegian	27	58,363
Panaman	2	1,336
Swedish	2	3,969
Total	276	1,079,586

RIVER SHIPPING AT NEW ORLEANS, JANUARY, 1929.

The arrivals of river shipping at the Port of New Orleans in January, 1929, were 300 vessels of all classes above 25 tons, with an aggregate tonnage of 107,087, which is an increase of 38 vessels and of 15,257 tons, as compared with the record for the same month of 1928. These vessels, according to the figures of the Port Commission, consisted of 19 Mississippi Warrior towboats of 14,069 tons, 100 Mississippi Warrior barges of 54,262 tons, 80 other barges of 27,333 tons, and 101 steamboats and power craft of 11,423 tons.

The business of the inner harbour navigation canal for the month also showed an increase, amounting to 67,636 tons, due principally to the larger number of ocean vessels using the commercial wharves. The total movement in the canal for the month of January was 698 vessels of all classes, having an aggregate tonnage of 369,054. These consisted, north-bound, of 43 Mississippi-Warrior vessels of 14,416 tons, 27 ocean steamships of 127,100 tons, and 279 other craft of 45,083 tons; south-bound, 45 Mississippi-Warrior vessels of 13,373 tons, 27 steamships of 124,825 tons, and 277 other craft of 44,257 tons.

ODERO LINE ENTERS NEW ORLEANS.

The Odera Line, operating vessels under the Italian flag, has announced the opening of a permanent office at New Orleans under Jules C. l'Hote as manager, and expects to maintain a semi-monthly service between New Orleans and Italian ports henceforth.

NEW APPOINTMENT.

After being at Grimsby in the capacity of engineer in charge of the Grimsby and Immingham Docks of the London and North-Eastern Railway Company for the past eleven years, Mr. Alfred Charles Gardner, M.I.C.E., M.I.M.E., A.M.I.E.E., is leaving to take up an appointment as engineer in charge to the Clyde Navigation Trust, Glasgow. He was selected for the post early in February out of a list of 53 candidates. Previous to settling down in Grimsby, Mr. Gardner had served with the London County Council, the Great Western Railway Company, and the Thames Ironworks Company, London. It was with the latter company that he received his early training, and whilst with them he was engaged on the construction of British and foreign battleships and also bridges for home and abroad. Mr. Gardner was the designer of the Grimsby Corporation Bridge which spans the Alexandra Dock and which cost £55,000, being opened by H.R.H. The Prince of Wales on the occasion of his visit in July last. Mr. Gardner was also responsible, under the late Sir James Ball, for the design of the Keadby Bridge, which is the heaviest lifting bridge in Europe. In his new appointment as engineer in chief to the Clyde Navigation Trust, Mr. Gardner will have under his care the whole of the docks at Glasgow, the whole of the River Clyde and all civil engineering in connection therewith.

Notes from the North.

COMPLETION OF £1,250,000 DOCK SCHEME.

When the alterations now being carried out to Alfred Dock, Birkenhead, are completed, the docks may be used by the largest vessels which pass through the Suez Canal. Not only has the river entrance to the dock been widened and deepened but also the passage between the Alfred Dock itself and the East Float. The passage now has two tremendous gates at each end. Each of the four sections was built on, and launched from, the spot where it was built. It is estimated that the cost of bringing the Birkenhead Docks system up-to-date and serviceable for the deepest vessels using the Suez Canal will cost over £1,250,000. It will be remembered that the widening and deepening the river entrance to the Alfred Dock was completed in July. The two passages between the Alfred Dock and East Float have now been converted into one wide and deep passage. The original passages were 50-ft. and 30-ft. wide, and these have been substituted by one 80-ft. in width. During the work of excavation, the passage was dammed at either end, while simultaneously preparations were in progress for the erection of the new swing bridge to span the widened passage. The new bridge carries the vehicular, pedestrian and railway traffic between the Birkenhead and Wallasey side of the dock, and forms part of the main roadway between the two Boroughs along Tower Road.

HOW THE WORK WAS DONE.

Fifteen months ago the old iron bridge which spanned the two small passages was removed, and in its place was erected a temporary wooden bridge. This has now been replaced by the monsters referred to above. Whilst the work of dismantling the wooden bridge was being undertaken, temporary arrangements were made for regulating the road and rail traffic during the seven days which the work occupied. The west roadway of the bridge was closed and traffic had to pass over the east roadway, and subsequently the east roadway was closed and all traffic was worked over the west roadway of the new swing bridge, for the erection of which, these arrangements had to be made. During the period of reconstruction, every effort was made to divert the traffic from the four bridges to across the Duke Street bridge and the Poulton bridge, which was toll free during the period of reconstruction. The drivers of vehicles were, therefore, required to use the Duke Street and Pool bridges owing to the delay caused by one-way traffic across the Alfred Dock entrance. Rail traffic across the four bridges was controlled by means of four field telephones operated by the police. These traffic arrangements almost coincided with the closing for repairs of the floating roadway at Woodside landing stage, and the diversion of all the luggage boats to the Seacombe-Liverpool route.

LAUNCHING A DOCK BRIDGE.

An interesting engineering feat was accomplished on February 5th, when the first "leaf" or section of the great steel gates to be erected at the west end of the section was placed in position. The gates, weighing about 200 tons per leaf, were built by Messrs. Armstrong, Whitworth & Co., on the quayside of the West Float Dock, and the first section was launched down a greased roadway into the dock. The huge steel structure slid easily down the "stocks," and there was a tremendous splash as it took the plunge and floated in the dock. The "leaf" was then towed to the Alfred Dock, where it was fixed in position on one side of the dock channel. The lower compartment of the gate was filled with water, and after several hours work it was fixed to the side by means of a massive collar strap attached to a pivot. The other "leaf" was later similarly attached on the other side. The gates are operated by hydraulic power. The wooden dams weighing 190 tons apiece, at the east side of the works, were previously lifted bodily from the bed of the dock and taken to the West Float, where they were deposited on the quay. The new 870-tons swing bridge is now open to traffic along both roadways. The cost of these works is about £300,000. The placing in position of the new bridge went off without ceremony. A hawser fastened to one end of the bridge was wound round a hydraulic capstan, and the bridge slowly spanned the passage. The passage, 40-ft. deep, was almost dry when the bridge was swung, but a crane was already at work removing the wooden dam. The passage was afterwards flooded.

RECONSTRUCTION OF FLOATING ROADWAY.

The cost of reconstructing the Woodside floating roadway is put at £25,000. After the last luggage boat from the Liverpool Landing Stage, on January 23rd, had reached Birkenhead and discharged its cargo of vehicles, the floating roadway was closed and employees of the Mersey Docks and Harbour Board took possession. Within a few hours portions of the roadway were ripped up and preparations made for its complete removal. The roadway, which con-

nects the Woodside luggage stage with the mainland, and is a little over a quarter of a mile in length, occupies a cutting between Woodside Ferry approach and the Birkenhead Lairages. Even at the lowest tides the greater part floats in water. The section supporting the roadway consists of eight floating sections and eight bridge sections, each supported by four big pontoons. Each section is joined to its neighbour by a short bridge-like structure strengthened beneath by girders. Each of the sections supported by the pontoons were towed up to the far end of the West Float, where they were scaled and examined, and where necessary, renewed. Other sections were lifted on to the deck of the landing stage by the Dock Board's huge floating crane "Mammoth." The work of reconstruction was carried out by the engineering staff of the Mersey Docks and Harbour Board, under the supervision of Mr. N. F. P. Pigott, the Board's resident engineer of the Birkenhead Docks. New deck sections to cover the pontoons and also new bridge sections were prepared and immediately the pontoons were overhauled at West Float, they were towed back to Woodside and replaced. At high tide, on February 13th, a start was made on the replacement of the reconstructed floating bridge for the Woodside Luggage Stage. The first sections were floated up the cutting and were connected with each other by bridge sections. The work was undertaken by the engineering department of the Mersey Docks and Harbour Board. Each of the eight floating sections is supported by eight pontoons, and, owing to the shallowness of the upper reaches of the cutting, close to the entrance to the Woodside Lairages, it was necessary to have a very high tide. New mooring fixtures had to be provided for attaching the bridge to the mainland. The work of reconstruction was completed on February 16th, on which date the Birkenhead Goods Ferry was reopened. The vehicular traffic, which had been allowed to cross the Mersey Docks and Harbour Board's bridge at Wallasey Pool free of charge, while the ferry was closed, is now charged the usual tolls.

It is worthy of note that this great piece of work was accomplished in much shorter time than was expected—three weeks instead of five. This was entirely due to a stroke of good luck, the state of the tide on the day when the shore connections with the reconstructed staging, were made. The replaced roadway had not been removed from its position from the time it was erected, 63 years ago. The new floating bridge which, apart from the pontoons, weighs 800 tons, has two tracks for vehicles, one for inward traffic and the other for vehicles going to the luggage boats, but the iron roadways are of a different and better type than the old ones, while the woodwork used by horses has a better gripping surface. The joints between the bridge of the pontoon sections have also been made wider, and sharp angles which were so manifest in the old roadway have practically disappeared.

FIRE IN M.D.H.B. REPAIR SHED.

Considerable damage was caused by fire at the Mersey Docks and Harbour Board's repair shed at Canada Creek, West Float, Birkenhead, on January 29th. The shed, which measures about 70-ft. by 40-ft., the roof being about 30-ft. in height, contained some valuable machinery, as most of the repair work in connection with the Birkenhead Dock Estate is carried on at this yard. When the fire was at its height the wooden sides of the shed burned furiously, and the fire brigade had some difficulty in obtaining the mastery. Fortunately they were able to confine the fire to one end of the shed. One of the important pieces of work being undertaken at the time was the reconstruction of the Woodside floating roadway which was dismantled the previous week-end and towed up to Canada Creek. Fortunately most of the dock work for the new roadways had already been completed and this was not damaged by the fire. The machinery, which was buried under a portion of the roof timbers which fell during the fire, included the drilling apparatus, forges, and other important repair plant.

WYRE DOCK WORKS.

Contracts may be let at any time now for the extension of the fish stages and the enlargement of the fish market at Wyre Docks, Fleetwood, upon which the directors of the L.M.S. Railway Co., have decided to spend over £100,000. The work will be put in hand almost immediately afterwards. By these extensions, the berthing space for trawlers will be increased nearly 50 per cent., and the market will be made one of the finest of its kind in the Kingdom.

PRESTON DOCK TRAFFIC.

Eighty-eight vessels, with a net tonnage of 39,442, entered Preston Dock during December, compared with 92, with a tonnage of 33,071, in the corresponding month of 1927. The imports and exports totalled 79,358 tons, compared with 64,206, and the revenue £22,315, against £19,042. During the nine months ended December, 1928, 832 vessels entered, compared with 859 in the corresponding period of 1927, and the total imports and exports were 610,588 tons, against 629,688.

HEAVY CRANE CRASHES.

An alarming crash occurred when a crane weighing 90 tons was being demolished on the Isle of Man steamers' landing stage at Fleetwood recently. The crane's giant arms, 50-ft. long, had been lowered as far as possible before the piercing of the mechanism with acetylene burners, which would enable the whole structure to be let down to the ground. Blocks were placed in position, but during its fall, one of the arms broke its back and the full weight crashed on to the wooden landing stage, smashing through the stout timbers as if they were matchwood. Part of the head of the crane protruded underneath the landing stage. The crane has been a quayside monarch at Fleetwood for over 60 years, and was built at Belfast so long ago as 1864. When originally tested, it had a lifting capacity of 50 tons.

MERSEY FERRY TO CLOSE.

Egremont Ferry (River Mersey) is to be closed for six weeks beginning May 28th, for the purpose of replacing the present defective stage. A new stage is to be erected in dock, and, when completed, will be floated into the Mersey and joined to the pier after the old structure has been dismantled. The work is being carried out by a Darlington firm at a cost of £28,800. During the period of closure, contract holders will, it is understood, have the option of using either Seacombe or New Brighton ferries, but they are unlikely to be allowed to travel free to either of the alternative ferries.

MASTER PORTERS' RATES.

Notice is given by Mersey Docks and Harbour Board that they have adopted an additional master porters' rate in respect of egg yolk in tins (unpacked), imported in refrigerators and delivered overside. The rate was laid before the Ministry of Transport on February 8th, and will become part of the Bye-Law No. 3 (1) of the Bye-Laws at the expiration of one month from that date, if no objections to the rate are made within the period mentioned.

Mersey Docks and Harbour Board proposes to revise the dock rates and town dues on cotton combings and linters and all descriptions of cotton waste, other than for manufacture of paper. The following rates and dues will be adopted, viz.: Dock rates and town dues, inwards, foreign, 2s. 4d. per ton; dock rates and town dues, outwards, foreign, 1s. 2d. per ton; town dues, inwards, coastwise, 7d. per ton; town dues, outwards, coastwise, 7d. per ton. Less 5 per cent.

OLD DOCK ENGINE.

The L.M.S. Railway Company are trying to find a site for the permanent home of Liverpool's old locomotive, The Lion, which was built in 1838 by Messrs. Kitson, of Leeds, for the Liverpool-Manchester Railway. It was bought by the Dock Board, in 1859, and up to August of last year the machinery portion of it worked chain pumps at the Prince's Graving Dock. The Board have substituted electric pumps at this dock, and they handed The Lion to the Liverpool Engineering Society to be preserved. The locomotive is lying covered with tarpaulin sheets at Prince's Dock, and it is desired to have it transported to Crewe railway works for reconditioning. When the centenary celebrations of the opening of the Liverpool-Manchester railway take place in September, 1930, The Lion we understand, is to have a prominent place.

RIVER DEE NAVIGATION.

At the annual meeting of the Dee Conservancy Board, held at Chester Town Hall, the return by the Board's collector of the number and tonnage of vessels arriving in 1928 as compared with 1927, shows an increase in number of 91 and an increase in tonnage of 7,717. It was suggested by Alderman Henry Powell (Flint) that the Chester Corporation and the Flintshire and Denbighshire County Councils might be able to assist the Board to do a little more for the river than they had hitherto been able to do. It would be a good thing if, by co-operation with other authorities, they could carry out a scheme for the improvement of the navigation of the Dee. Government aid could be secured if there was the will to do it, and he thought the time was now ripe. The Board could not do anything without financial assistance, and if they could enlist the help of the local authorities he was sure it would be to their own benefit. It was decided to instruct the conservator to submit a scheme to the Board, who would then consider whether it should be placed before the local authorities.

Mr. A. Caradoc Williams, the acting conservator to the Dee Conservancy Board, in his annual report, states that the average condition of the navigation with respect to depth has been a little better in 1928 than it was in 1927. The low water channel below Connah's Quay still crosses the northern training wall, and traffic throughout the year had passed through the hollows in the wall. The movement seaward of the low water channel along the wall has continued, and it is probable that the next change may take the channel clear of the training wall. The northern training wall above the breach has been maintained, 105 tons of stone have been used on it, and the

wall is in a good condition. The extension of the high training bank has been continued and the total length at the end of December was 2,310 yards, and this work has maintained the improvement which was noted last year. During the year 252 tons of stone have been deposited along the face of the northern embankment, between the higher ferry and Hawarden Bridge.

MERSEY TUNNEL PROGRESS.

Seven hundred men are now at work in building the Mersey Tunnel. A meeting of the Tunnel Committee was held at Liverpool on February 13th, when the engineers reported that Contract No. 2 for the construction of the full-size tunnel is in active progress at seven points and twelve working faces. Excavation to date amounted to 52,000 cubic yards, or 20 per cent. of the total in the contract. Of the cast-iron lining there are now in place 1,080 top-half rings, totalling 11,300 tons, or 21 per cent. of the total. About 700 men are directly employed on the contract, the amount of which is £1,413,601. In connection with Contract No. 3, which is for the two full-size tunnels on the Birkenhead side, a start has been made for a working shaft at Sidney Street, Birkenhead. Contract No. 4, which will be placed shortly, will comprise the construction of full-size tunnels from George's Dock shaft to the portals at Old Haymarket and New Quay, Liverpool respectively.

NEW PNEUMATIC ELEVATORS FOR LIVERPOOL.

Believing it to be in the interests of the grain trade of this country that they should be able to discharge grain directly into warehouses without the intervention and extra expense of barging, the Liverpool Grain Storage and Transit Co., Ltd., has concluded an arrangement with the Mersey Docks and Harbour Board for new dock plant. They propose to instal at the South-East side, No. 2 Alexandra Dock, two pneumatic intake elevators and conveying bands to discharge and convey to their warehouses direct from steamers, grain at the rate of 500 tons per hour. This will enable them to discharge cargo vessels up to about 7,000 tons capacity in two days of ordinary working hours. These elevators will feed directly to conveyor bands erected in the quay sheds, which will communicate with the existing conveyor mechanism running between No. 1 and No. 2 Transit Silos. Thus it will be possible to distribute the grain throughout the premises in proper tenderable quantities at approximately the same speed as the discharge. The saving in working expenses will be considerable. The company hopes to be able to make a reduction to customers in the handling of grain cargoes. The installation should be completed and in working order by September of this year.

BIRKENHEAD FERRY APPROACHES.

Birkenhead Corporation is to make an early start on the scheme for the improvement of the approaches to the Woodside Ferry. The work is estimated to cost £2,300. It is intended to remove the paving between the island footway, the hoarding on the north-west side, and of the footway, and to construct a flagged footway 17-ft. wide adjoining the hoarding and repaving the roadway. The scheme will probably be completed for the summer traffic. It is hoped to secure a grant from the Ministry of Transport.

PRINCE'S DOCK IMPROVEMENTS.

Dock improvement schemes estimated to cost £201,170 were approved by the Mersey Docks and Harbour Board at their meeting on February 15th. The Works Committee minutes included two recommendations:—(1) the engineer be authorised to put in hand the work of reconstructing the east quay of the Prince's Dock, and the provision of a single-storey shed, complete with roadways and lines of rails, at a total estimated cost of £141,376; (2) acceptance of the offer of Sir Wm. Arrol & Co., Ltd., for the construction and erection of a new rolling bascule bridge across the Duke Street Passage, Birkenhead, at a cost of £59,704. In proposing the confirmation of the proceedings of the Works Committee, Mr. H. B. Gordon Warren, the Chairman, explained that early in November last it was decided to widen the entrance of the Prince's Dock to 60-ft., and to modernise the old shed on the western side of the dock. At that time he explained that the Works Committee hoped shortly to bring before the Board a proposal for further improvements at the dock. The plans approved involved the total reconstruction of the eastern side of the dock. The quay would be extended the whole length of the dock and on it would be built a shed 60-ft. wide and 1,500-ft. long. The shed would be capable of carrying roof cranes up to 30 cwt. or 2 tons capacity. The roof cranes, if required, would be applied for and paid for by the berth holders. On the road side of the shed it was intended that there should be two lines of rails connecting both the north and the south ends with the dock line of railway with the necessary cross-overs; between the railway lines and the dock line of railway there would be a roadway of sufficient width for two lines of vehicles. The Works Committee were almost unanimous in adopting this proposal, the only objection being due to the large capital expenditure. It was desirable that alterations to the eastern

side of the dock should be carried out within a short time. Therefore they recommended the proposal now brought forward be adopted at once. The Board were most anxious to encourage the coasting trade, for which Prince's Dock was so suitably situated, by providing modern appliances and modernising the equipment generally so that the dock might be ready for the new steamers now being built. In conformity with standing orders, confirmation of the recommendations was postponed until the meeting on February 22nd.

Recent Legal Decisions.

The recent decision of Mr. Justice Wright in the case of *Evans v. Webster Bros., Ltd.*, is of practical interest to all Dock Authorities who are concerned in any way with the receiving and storing of goods, and the consequent necessary dealings with Bills of Lading. To adequately explain it, a short preliminary note on the general law may be called for.

A shipmaster cannot bind his owners by signing bills of lading for goods that were never shipped at all; but the bill of lading is *prima facie* evidence that they were shipped, and the burden of disproving it lies on the owner. The owner may, however, by express stipulation, bind himself to accept the statement of quantity shipped in the bill of lading, though all the goods enumerated therein are not shipped. This is usually done by the insertion in the bill of lading of what is known as the conclusive evidence clause, which does not appear to be affected by the Carriage of Goods by Sea Act, 1924, for Article V. of the rules enables a carrier to surrender any of his rights, and to increase any of his liabilities, and this stipulation most frequently appears in timber bills of lading. Under it the shipowner will be liable, though it is otherwise clear that the timber was not "received" or "taken on board." And where with such a clause the bill of lading specifies quantities of different sorts of goods (e.g., deals and boards), he is equally bound as to both; so that if there is a short delivery of deals, and over-delivery of boards, he cannot take the two together as representing the total quantity of both (*Mediterranean Co. v. MacKay* (1907), 1 K.B., 297). To free himself the shipowner must prove loss by excepted perils after "taking on board"; loss by excepted even perils alongside the ship will not do.

Shipowners may meet the difficulty by adding to the statement of cargo shipped in the bill of lading a marginal note, "so many timbers of above lost alongside," or similar words. This seems to make the bill of lading contain no conclusive statement of quantity shipped, and it was so treated in *Lohden v. Calder*, 1898, 14 T.L.R., 311.

A notable case on the conclusive evidence clause was *Lishmann v. Christie* (1887), 19, Q.B.D. Sleepers were shipped under a charter containing the clause, "Bill of Lading shall be conclusive evidence against the owner of the quantity of cargo received." 2,000 sleepers were delivered in the water alongside of the ship, and the mate signed a receipt for them; some were lost before shipment, but the captain signed a bill for the whole 2,000, knowing that some were not shipped, and making some slight protest. It was held that the shipowner, having agreed to be bound by the statement in the bill of lading, was stopped from disputing its truth, though, apart from such agreement, the captain had no authority to sign such a bill of lading.

In the above-mentioned case of *Evans v. Webster Bros., Ltd.*, Mr. Justice Wright has virtually followed *Lishmann v. Christie*. In 1927 the defendants bought certain timber in Nova Scotia. The timber was to be shipped from Parrsboro Roads, Nova Scotia, to Garston Dock, near Liverpool, and was in fact shipped on a steamer belonging to the plaintiff. The bill of lading, which the defendants now held as indorsees, was dated 28th July, 1927. It was a clean bill, and stated that a specified quantity of the timber had been shipped in good order and condition, whereas, in fact, the quantity of the timber delivered was less than the specified quantity, and of the amount delivered part was stained and damaged. In this action the plaintiff claimed freight (admitted), but the defendants, who were indorsees of the bill of lading, counterclaimed in respect of short delivery, and they relied on the fact that they held a clean bill of lading.

The charter party contained, *inter alia*, an exception of perils of the sea. It also contained provisions that payment should be made on right delivery of the cargo; that the cargo should be brought to, and taken from, alongside at charterer's expense as customary; that bill of lading should be conclusive evidence against the owners as establishing the aggregate number of pieces delivered to the steamer; and that "bills of lading in the form indorsed on this charter party shall be signed by the master." The bill of lading held by the defendants stated that a particular quantity of goods had been shipped and had been shipped in good condition, to be delivered in the like good order and condition, perils of the sea excepted; and it contained a clause saying that "all the conditions, terms, and exceptions" contained in the charter party were incorporated with it.

The evidence given by the master of the steamer was to the effect that at Parrsboro Roads steamers had to lie at an

anchorage off the port, and cargo came out to them in scows. Part of the cargo in this case was wet and stained when delivered from the scow. The witness noticed that it was in bad condition, and spoke to the shipper, one Huntley, about it, saying that he could not sign a clean bill of lading for it. Huntley said that he must sign a clean bill, but could protect himself by noting at the same time a protest setting out all the facts. Huntley said that he must have a clean bill, as when he had clean bills of lading he could raise money on them. The witness said that he then signed a clean bill, and also signed a protest. All that he was concerned about was to protect his owner.

In law, the argument of the plaintiffs was in fact that the defendants could not in the circumstances rely on an estoppel arising out of the statement in the bill of lading that the cargo had been shipped in good order and condition, because estoppel could only arise where a party had acted on the faith of a statement, and that he could not act on the faith of a statement if he knew at the material time that the statement was untrue.

Now, while that is sound enough in principle, could it nevertheless be said that there was such information before the defendants in this case as to debar them from relying on the statement in the bill of lading? That statement was clear and unambiguous, and it was essential that the conditions in which goods were shipped should always be stated by the master. He must know that the bill of lading was a document which, in ordinary course of commerce, would be transferred for value and would be dealt with as a document of title. A shipowner, therefore, should not be allowed to say that a bill of lading holder could not rely on the statement in the bill of lading unless the information in possession of the bill of lading holder contradicting the statement was of at least as much weight as the statement itself. There might possibly be cases where the holder knew from independent knowledge that the bill of lading was inaccurate, but such cases must be rare.

The conclusion reached by the Court was that the information of the defendants here was not of such a nature as to justify them in rejecting the bill of lading. The master's protest was not of superior value to the bill of lading; the latter was the authoritative document, and the defendants were entitled to act on it. It was held, therefore, that the plaintiff was estopped from disputing the statement in the bill of lading saying that the defendants' cargo had been shipped in good order and condition.

A shipowner is not bound by the conclusive evidence clause if he can show fraud, and in this case it was argued that a fraud had been perpetrated on the shipmaster, but that suggestion was held not proved.

HAMBURG SHIPPING TRAFFIC IN JANUARY, 1929.

A report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg states that as compared with December there was a decline of 75,000 tons in the total tonnage entered at the port in January, due presumably to the severe ice conditions. The tonnage cleared with cargo was almost the same as in December.

British shipping in January amounted to 184 vessels (341,861 tons) entered and 190 vessels (370,717 tons) cleared, compared with 205 vessels (379,620 tons) entered and 200 vessels (368,535 tons) cleared in December last.

German tonnage in January amounted to 765,618 tons entered (796,882 tons in December), and 782,974 tons cleared (758,776 tons in December last).

Personal enquiries regarding shipping and transport matters should be made at the City office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

RECORD SHIPMENT OF PIG IRON AT IMMINGHAM.

A record in the shipping of pig iron was claimed for Immingham by Inspector Raynham, who spoke at the annual dinner of the L. and N.E. Railway Portmaster's outside staff, on Friday, February 15th. Mr. Raynham said that last year nearly a quarter of a million tons of pig iron were handled. With two cranes 1,080 tons of pig iron were shipped in less than eight hours, he declared, and he added that if anyone could beat that he would like to know who they were. This, he said, was repeated three times within eight days. He belonged to a quick turn round port and if they wanted records they must go to Immingham. He regretted, however, that the volume of trade at Immingham during the past year had not been up to his expectations, although there were some improvements in some of the heavy goods.

Mr. R. H. Hellyer (assistant portmaster) said that although last year had brought a bigger tonnage, it had not created enough work. They needed more of the China trade-goods which went into the sheds and out again, and which created work in handling. They had dealt with a quarter of a million tons of pig iron, but pig iron was handled quickly and did not leave many pence per ton for the people who handled it. Still, it was better than nothing. They had handled a very big tonnage of pit props during the year, but as a company they had not much to do with regard to handling them,

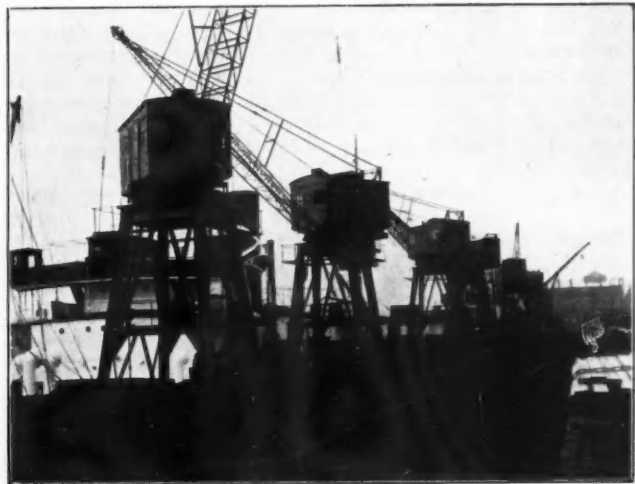
Hartlepool Developments.

It may be taken as a most hopeful sign that the London and North-Eastern Railway have decided upon an important scheme of development at the Hartlepoons to cope with the increasing coal shipments. Within recent years the export of



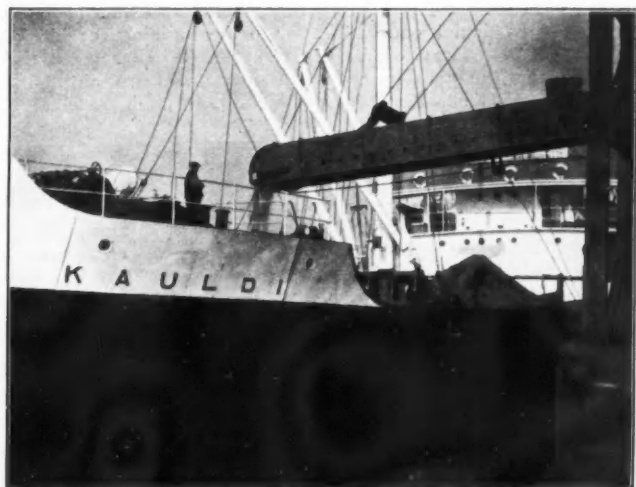
Main Coaling Jetty, L.N.E.R., Hartlepool Docks.

coal and coke from the Hartlepoons has greatly expanded, and the necessity for the extension and improvement of the facilities afforded for its shipment has become more and more pressing. Last year the export of coal and coke reached the record figure



Discharging Zinc Ore from Ship to Truck at L.N.E.R., Hartlepool Docks.

of 3,265,767 tons, 2,812,614 tons being shipped from Hartlepool and 453,153 tons from West Hartlepool. The total for the year was over 600,000 tons more than that for 1927 and 865,000 tons greater than the previous record in 1913.



One of the Coaling Belt Conveyors at work, L.N.E.R., Hartlepool Docks.

The scheme, we are officially informed, has been approved, and work is to be put in hand immediately. The alterations at West Hartlepool will be very extensive. The old staiths in Harbour Terrace will be pulled down and new staiths erected and

up-to-date appliances installed. The new staiths will be capable of dealing with 20-ton trucks, whereas the present staiths can only carry trucks containing 10½ tons. In place of the present hoist a belt conveyor will be provided, in addition to gravity spouts.

At what is known as the Tay Bridge, where there are now two gravity staiths, an additional belt conveyor will be installed.

At Hartlepool, at the north-east corner of the Victoria Dock, where, about two years ago two berths were provided for coaling trawlers, a third berth is to be added for coaling trawlers and drifters and for loading medium-sized coasting vessels. At the main jetty, which is situated between the Victoria Dock and Harbour, a new belt conveyor is to be installed to enable the bunkering of larger vessels. A number of minor improvements will be involved in the alterations and extensions, and when the work is completed the facilities of the port will be very considerably increased.

Advertising Great Britain Abroad.

Million Pound Fund suggestions to Prime Minister. Dursley Firm's Offer.

Following the Prince of Wales' "Salesmanship" speech on the opening day of the British Industries Fair, Mr. Percy Lister, Managing Director of R. A. Lister and Co., Ltd., of Dursley in Gloucestershire, has sent a letter to the Prime Minister urging the creation of a Million Pound Fund to advertise British goods abroad. His firm offers to subscribe £5,000 to start the Fund.

Mr. Lister's letter is as follows:—

The Right Hon. Stanley Baldwin, M.P.,

10, Downing Street,
S.W.1.

22nd February, 1929.

Dear Prime Minister,

In his speech on the opening day of the British Industries Fair, the Prince of Wales urged on the business community the need for improving the salesmanship of British goods.

While the Prince's words are fresh in people's minds, I venture to bring to your notice a suggestion which, if adopted, would, I believe, go a long way towards helping the country out of its present difficulties. It involves the creation by British industry itself of a Fund on a substantial scale to advertise its goods overseas.

That a million pounds judiciously spent to advertise British goods abroad would bring far more than commensurate results will be admitted by everyone who has any experience of modern advertising methods. Is British industry prepared to back its belief in the genuine value represented by its goods to the extent of putting up half a million pounds to advertise them? My firm, R. A. Lister and Co., Ltd., of Dursley, Gloucestershire, is willing to pay its share, and if ninety-nine other firms will do the same, it will subscribe £5,000 to a National Advertising Fund, the money to be expended by a Committee of experts representing industry and nominated by the Government. Will other firms follow suit?

And if British industry contributes the first half million, will the Government go "fifty-fifty" with it in its attempt to increase employment, and contribute another half million for the same purpose from the National Exchequer? Through its grant to the Empire Marketing Board and its support of the new "Come-to-Britain" campaign, it has already admitted the value of spending money on national advertising. Here is a way in which its money could be most effectively employed in relieving our most urgent national problem. And if once the Fund were opened it would soon, I venture to believe, far exceed the original half million suggested.

Ten years after the end of the War we are faced with an unemployment roll of nearly a million and a half, and British manufacturers are confronted with competition at home and abroad of a severity probably unparalleled in the history of British commerce.

That competition has to be met, for merely to produce goods, however high may be their quality, is, as the Prince of Wales himself pointed out, only half the battle. In addition, they must be marketed, and in our marketing arrangements we lag seriously and in many respects behind other countries. One of the most serious of these respects is advertising. Some individual firms and industrial associations advertise quite widely in the overseas market as well as the home market. But far more is needed if success is to come our way, and a campaign of corporate advertising by British industry as a whole would be of the greatest possible value in bringing the name of Great Britain and things British before those enormous potential markets which exist in every continent.

I would not obtrude myself on your attention at this time were it not that I am convinced of the soundness of the suggestion I make, and of the need of bringing it to the attention of British industry before the thoughts of the country are turned away from industry by the turmoil of the general election. Sympathy for the unemployed there exists in every heart. Here, I submit, is a practical and practicable proposal for giving expression to it.

I have the honour to be, Sir,

Your obedient servant,

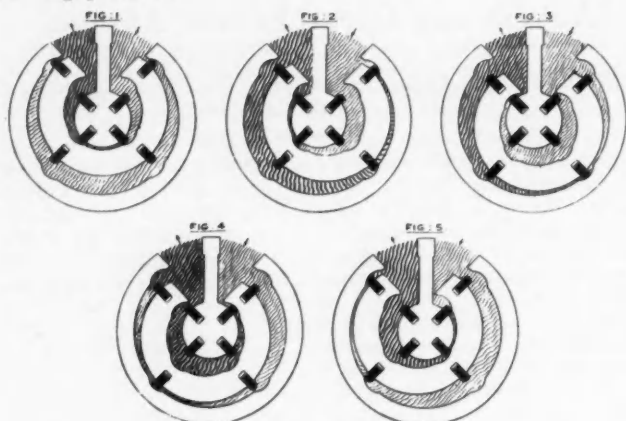
(Signed) C. PERCY LISTER,

Managing Director, R. A. Lister and Co., Ltd.

Harbour Engineering Notes.

THE PARACYCLIC PUMP.

A new type of pump of novel design and high efficiency has been placed on the market by Caldwell and Co., of Elliot Street, Glasgow, known as the paracyclic pump, the action of which will best be understood by the diagrams. The displacer which moves with a paracyclic motion has a definite clearance between it and the pump casing, while the water seal is effected by the contact strips which are free to move to a small extent in their guides. These strips are held in contact with the bearing surfaces or scallops formed in the pump casing by the pressure of the liquid behind the strips; a flexible joint is thus provided which permits of small pieces of solid matter passing through the pump without detriment to its working and obviates necessity for fine straining of the liquid. In the diagrams the faint shading represents suction and the dark shading pressure.



Diagrams of the Paracyclic Pump.

It is of interest to note that this pump is not dependent upon fine clearance between the rotor and the casing. The definite contact of the strips with the scallops ensures that maximum suction and pumping capacity will be maintained even after the bearings may have worn considerably. This has been demonstrated by taking a standard pump and reducing all bearing to a clearance of 0.030-in., when it was found that the volumetric efficiency was unaffected.

The movement of the strips in their guides on making and breaking contact with the scallops is about 0.05-in. in medium size pumps, but there is no movement during contact. If, after a long period of working, the allowance for wear of the strips be used up, they will continue to sweep past the scallops with a fine clearance or the strips may be replaced at small cost. The outward movement of the strips is limited by the projection on one side and the corresponding groove in the guides, as shown in Fig. 2.

In this pump, with its paracyclic motion, the relative surface in contact between the displacer and the pump casing is very small as compared with that type of rotary pump in which the periphery of the rotor sweeps round the whole of the casing.

A NEW MOTOR CONTROL PANEL FOR DOCKYARDS.

An interesting development in d.c. motor control panels for constant speed service is the form CDM, type W, which is designed for starting and protecting stationary, non-reversing, constant speed, shunt-, series- or compound-wound d.c. motors, from 3 to 18 h.p. at voltages ranging from 100 to 600. They can be used on systems having an earthed neutral or negative provided that the full load current does not exceed 30 amps. at 500 volts, or 20 amps. at 550/600 volts. For larger motors on such systems, the use of control pillars having contractor circuit breakers is to be recommended. These starters are rated for starting four times per hour against full load torque, but at least fourteen times the starting period should be allowed between starts for cooling. They comply with the Home Office regulations and B.E.S.A. specifications for "Ordinary Duty."

The panels are equipped with a rheostatic starter, the casing of which also encloses a line switch, two fuses, an under-voltage release and an over-current relay. The panels are completely wired ready for connection to line and motor, so that installation costs are reduced.

The starting panel is enclosed in a cast iron box, the joint between the case and cover being packed with rubber, making it dust-tight and weatherproof. The cover, which is lined with asbestos is hinged and can only be opened when the line switch is in the off position. The line terminals are shrouded so that work can be done on the open panel without risk of shock.

The starter is fitted with under-voltage and overload devices. The under-voltage release is fitted to the starter, thus ensuring that if the supply voltage fails, or is considerably lowered, the

starter switch arm will be released and will return to the off position. When used with constant speed shunt- or compound-wound motors, the release coil is connected in series with the shunt field, but for series-wound motors and variable speed shunt- or compound-wound machines of wide speed range, the under-voltage release is separately excited.

An adjustable over-current relay is embodied in the starter and can be set to operate at 100, 125 or 150 per cent. of full load rating. The fuses form an additional protection against a severe overload or short circuit.

THE RELAY FIRE ALARM SYSTEM.

Some form of fire alarm is generally considered necessary in most industrial plants such as factories and dockyard buildings, and the most common arrangement is a number of glass-fronted pushes scattered throughout the buildings, the breaking of the glass causing an indicator to drop in the local fire station, showing the point from which the alarm has been given and usually causing one or more bells to sound the alarm. The members of the house fire brigade, on hearing the bell, go at once to the house fire station to ascertain the position of the alarm, and then proceed to that point. This procedure obviously involves a wastage of valuable time, because members of the house brigade may often proceed away from the seat of the outbreak on their way to the fire station, and then have to retrace their steps and so lose what may be vital minutes.

It is claimed that the new Relay scheme eliminates all such waste of time and all risk of confusion; it is an inexpensive but expeditious fire alarm system, and should be found particularly useful in dockyards. Two types of relay automatic fire alarm services are available: one, an independent installation, and the other an installation to work in conjunction with the Relay automatic telephone service.

In the case of the independent scheme, where an installation is required for 25 points or less, this consists of a staff calling panel, the requisite number of glass-fronted push alarms, and a fire bell or bells. To give the alarm the glass in the push is broken, when the staff calling panel immediately sends out on the fire bells a distinctive code signal, indicating where the call has originated. Where an installation is required for more than 25 alarm pushes, this comprises a staff call panel, fire alarm indicator panel, push alarms, and the fire bell or bells, as the case may be.

To give the alarm in this case, the glass in the push alarm is broken, causing an indicator in the indicator panel to drop and reveal the push where the glass has been broken, at the same time starting the staff call to sound the code alarm, indicating in which particular building or part of a building the alarm originated. The whole process is automatic, from the breaking of the glass, and is instantaneous.

After an alarm has been given it is very desirable to stop the code as early as possible. This might normally be done by replacing the glass in the push, but it is always possible, however, that there may be no push left in which to insert the glass, or the wiring may be damaged by fire and rendered useless. A feature of all Relay fire alarm installations is the provision made on the fire station indicator board to isolate the point from which the alarm has been given.

In very large or widespread establishments the scheme is extended, a main indicator being fitted in the house fire station and a sub-indicator in each building or block.

In this case, when the glass of the fire alarm push is broken, a sub-indicator in the building, or section of the building, involved, discloses the origin of the alarm, and the main indicator instantaneously shows the position of the building or block concerned. At the same time the staff caller at once sounds the particular code allocated to the building, or block, from which the alarm has been given. As in the case of the smaller type of installation, the whole operation from the breaking of the glass is automatic and instantaneous.

FORMER DOCK CHIEF DIES.

Mr. T. M. Williams, C.B., who died at Bournemouth recently, was for 18 years Dock and Marine Manager at Southampton, and to him can be attributed not a little of the progress which Southampton has achieved. It was he, so to speak, who laid the foundations of present prosperity. Mr. Williams took control at the docks at the end of 1901, and one of the outstanding features of his regime was the opening, in 1911, of the Ocean Dock, which was built specially for the berthing of the White Star liners when the Company transferred the express service from Liverpool to Southampton. At an early age Mr. Williams was Assistant Traffic Manager to the Canadian Pacific Railway at Liverpool. He afterwards went to South America, where he had an extensive experience in railway and harbour work. Just prior to coming to Southampton he held the position of Port Master at Grimsby. Whilst at Southampton he recognised the need for dock extension, and gave considerable attention to the original scheme for developing accommodation on the Western Shore. This scheme was abandoned in favour of the one now in progress.

Metallic Arc Welding.

Welding in all its forms is playing such an important part in engineering work to-day that it is essential, in keeping abreast of the times, to have a knowledge of the various forms of welding at one's finger-tips, so that, in the event of any work arising in which welding appears to be practicable, the most suitable process may be readily selected. Various articles have appeared in these columns dealing with electric welding, and one or two descriptions have appeared detailing special jobs, such as that on Ryde Pier of the Southern Railway Company, in which a large reconstruction was undertaken by the company's engineers, using the electric arc and quasi-arc electrodes ("Dock and Harbour Authority" for December, 1928, page 42). In this article it is proposed to give some details of the "Electronic Tornado" as applied to the carbon arc welding process, the details being kindly supplied to the writer by the Lincoln Electric Co.

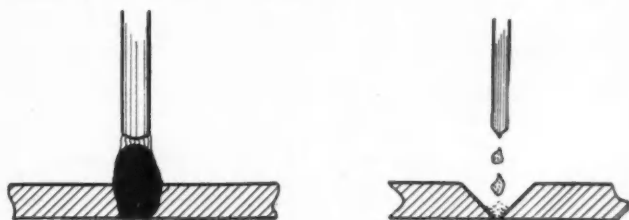


Fig. 1. In carbon electrode welding, a filler rod of mild steel is placed along the seam prior to welding, to supply additional metal to reinforce the weld. In metallic electrode welding, the metal to form the weld is added, drop by drop, from the electrode itself.

In any consideration of automatic arc welding it is important to have clearly in mind the difference between the metallic arc process and the carbon arc process. In the metallic arc process the arc is formed between the work to be welded and a metallic wire. Metal to form the weld is melted from this wire and deposited drop by drop on the parts to be joined. It is the bonding of these successive globules with the plates themselves and with each other that forms the weld. In all but the lighter gauges of metal it is necessary to scarf the edges of the plates to be joined in order to form a vee for the deposited metal. Fig. 1 makes this clear.

In carbon arc welding the arc is formed between the plates to be welded and a carbon electrode. This carbon electrode moves along the seam, fusing the edges of the plates. Directly under the arc is a pool of molten metal. The two plate edges are fused simultaneously and cool simultaneously. The weld is made by puddling rather than by deposition, as is the case with metallic arc welding. Where extra metal is required to reinforce the weld it is added in the form of a filler strip which is laid along the seam prior to welding.

Almost startling improvements have been made in the carbon arc method of welding, which accounts for appreciable reduction in costs as well as greatly improved welds. The improvements are the result of a newly-discovered method of controlling and localising the heat of the electric arc. An entirely new method of welding results, and this has been christened the "Electronic Tornado."

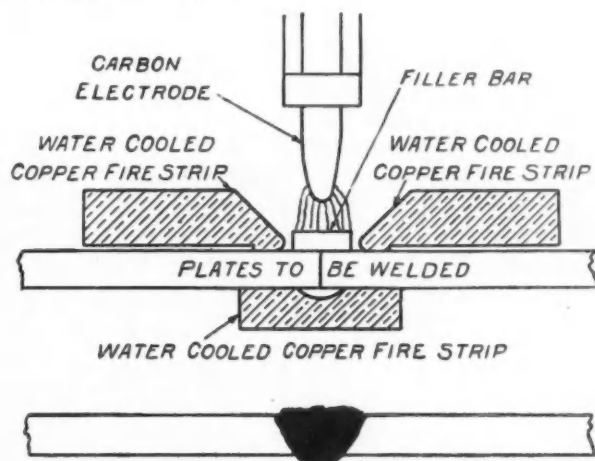


Fig. 2. Diagrammatic View of old carbon electrode process of automatic arc welding.

The electric arc is normally a difficult phenomenon to control. It sets up its own magnetic field, and the passage of the welding current through the parts being welded creates other magnetic fields of variable direction and intensity. The arc, therefore, tends to wander, seeking the path of least resistance between its own magnetic field and the field produced by the passage of the welding current through the piece being welded. The path of a lightning bolt is typical of an uncontrolled arc. This fluctuation of the arc tends to dissipate the

heat over a wide area on either side of the seam, where much of it must be wasted. The speed of welding must, of course, be held down to a speed which will permit the arc to melt the plate edges notwithstanding the heat that is wasted by the spreading out of the arc flame.

Now, by utilising a newly-discovered principle, the arc stream is so focussed and localised that all the heat of the arc is concentrated in a very small area directly underneath the arc. Briefly, that is accomplished by superimposing a strong magnetic field on the arc flame. This new control gives the electrons of the arc flame a rapidly gyrating motion, thus giving rise to the new name.

While the basic principles of this electronic tornado are fairly simple, the effectiveness of this control as applied to automatic arc welding is most surprising. First, welds made by this process show a crystalline structure comparable to that of the best electric steel. Instead of the metal in the weld being inferior to the metals of the plates joined, it is actually better than that of the parent metal. The uniform heating and cooling permit the crystals to arrange themselves in uniform groupings. The structure obtained is no doubt due partly to the heat-treating effect.

Test pieces with carbon arc welded joints were cut into sections from $\frac{1}{4}$ -in. and $\frac{1}{2}$ -in. plate, and then twisted through three complete revolutions, there being no sign of a fracture in the weld metal and no line of cleavage between the plates joined.

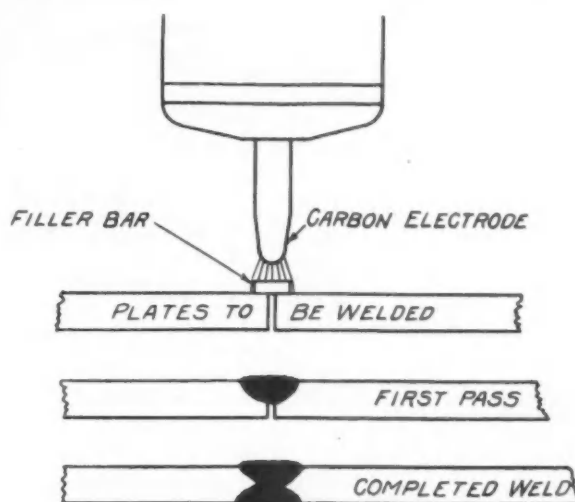


Fig. 3. Diagrammatic View of electronic tornado process of automatic arc welding. Note absence of all water-cooled fire strips.

The practical application of the electronic tornado to automatic arc welding differs in one important particular from ordinary carbon arc automatic welding. This is the actual method of making the weld. By the older process the weld was made by passing the electrode once along the seam. The arc melted the plate edges so that the entire thickness of the edge directly under the electrode was molten. This molten metal was confined on the bottom by a water-cooled copper fire strip. Usually the fire strip was grooved to give the proper shape to the bead on the underside of the plates. Likewise, the water-cooled fire strips were used on top of the plates, parallel to the seam to confine the molten metal. In effect, these fire strips constituted a mould which determined the shape of the welded bead. Heavy clamps were used to hold the plates in place and to carry the fire strips.

With the electronic tornado process as applied to heavier work, all this equipment is unnecessary. Except on plate $\frac{1}{4}$ -in. thick, or lighter, the arc does not penetrate all the way through the plates. Welds are made by successive passes over the seam. For instance, on $\frac{1}{2}$ -in. plate, the head of the arc would be so adjusted that the weld would penetrate slightly more than half-way through the plate on the first traverse of the welding bead. Then the plates would be turned over and the welding bead would be traversed along the seam on the other side, again penetrating slightly more than half-way through.

It is readily apparent that backing-up strips are unnecessary since the metal on the bottom of the plates is not melted. By making the weld in multiple passes of the arc it is possible greatly to simplify the equipment for automatic welding. In fact, often all that is necessary is to provide some mechanism for traversing the welding bead at the proper rate of speed.

As stated above, on plates less than $\frac{1}{4}$ -in. thick, the weld is made in a single traverse of the welding head. This means that when welding plate of this thickness, some simple backing-up strip is required.

One great field of usefulness for the electronic tornado process is in pipe and tank welding, where it will materially reduce welding costs. There are, however, many other jobs which are not now being welded automatically which can economically utilise this process.

The Dock and Harbour Authorities' Association.

Annual Report for year ended Dec. 31st, 1928.

At the Annual General Meeting of the Dock and Harbour Authorities' Association, held on Wednesday, the 20th February, 1929, at the Caxton Hall, Westminster, London, the Executive Committee presented the Ninth Report (year ending 31st December, 1928) of the proceedings of the Association, which was adopted.

MEETINGS.

During the year, in addition to the Annual General Meeting of the Association, there have been six meetings of the Executive Committee and twelve (six joint) meetings of sub-committees. The Association have been represented at numerous Conferences with Government Departments and meetings with other bodies.

Twenty-six Circulars, including two Interim or Progress reports (May and August), have been issued to members on various matters of interest arising during the year (a list of the principal ones being given under the heading "Miscellaneous.")

EXECUTIVE COMMITTEE.

The Committee elected Mr. R. D. Holt, the Chairman of the Mersey Docks and Harbour Board, as their Chairman for the year in place of the late Mr. C. F. Torrey.

Two vacancies occurred on the Committee during the year, which were filled (Rule 7 (1) (E)) as follows:—

Mr. W. Hewat to represent the Irish Free State in the place of the late Mr. John Hollwey, whose death was reported at the last annual meeting.

Mr. T. A. Peace to represent the Bristol Channel District in the place of Mr. D. Ross-Johnson, who resigned in September on retiring from the position, in which he was succeeded by Mr. Peace, of General Manager to the Port of Bristol Authority. Mr. Ross-Johnson had represented the Bristol District since the formation of the Association and on the earlier Dock Authorities' Committee, and the Committee wish to place on record their appreciation of his work for the Association and the previous Dock Authorities' Committee which extended over a considerable number of years.

SUB-COMMITTEES.

Railway matters.—Mr. J. H. Estill, Mr. E. Latimer, Mr. James Macfarlane, Mr. D. Ross-Johnson, Mr. L. A. P. Warner, and the Hon. Secretary, with Mr. J. D. Ritchie and Mr. E. A. Moorhouse added for Railway Rates Inquiry and Railway (Road Transport) Bills.

Dock and Factory matters.—Mr. Latimer, Mr. Macfarlane, Mr. Ross-Johnson, Mr. Warner, Mr. G. S. Maskall, and the Hon. Secretary, with Mr. Ritchie and Mr. Moorhouse added for (a) the Factories Bill, and (b) the purposes of Dock Police—Exchequer Grant, and Sir John Irvin added for the purposes of (b).

Customs Hours at Docks and Warehouses.—Mr. Maskall, Mr. Ross-Johnson, Mr. Warner, and the Hon. Secretary.

International Maritime Conventions.—Mr. Roger Clayton, Major E. G. Finch, Mr. Ritchie, and the Hon. Secretary. Duties, etc., of Harbour and Pilotage Authorities.—Mr. B. L. Nairn, Major Finch, and the Hon. Secretary.

Subscriptions of Harbour and Conservancy, Irish Free State, and Pilotage Authorities.—The Chairman, Mr. W. Hewat, and the Hon. Secretary.

Rating and Valuation matters.—Mr. D. O. Dunlop, Mr. Moorhouse, Mr. Ritchie, Mr. O. W. Young, and the Hon. Secretary.

Buoyage and Lighting of Coasts.—Commander J. Whitla Gracey, R.N.R., Captain F. W. Mace, R.N.R., Mr. D. Alan Stevenson, and the Hon. Secretary, with Major Finch, Mr. J. D. Ritchie and Mr. J. H. Amos added for River Pollution questions.

MEMBERS.

The Association this year comprised 45 Authorities, dealing with a tonnage (excluding Irish Free State and Pilotage, etc., Authorities not covered by the Board of Trade Returns) representing about 71 per cent. of the total tonnage of vessels with cargoes arriving at and departing from Ports of the United Kingdom.

BILLS IN PARLIAMENT.

The undermentioned Bills were considered amongst others, and action was taken where necessary to protect the interests of Dock Authorities:—

I.—SESSION ENDED AUGUST, 1928.

(1) BILLS WHICH RECEIVED THE ROYAL ASSENT.

(a) Public Acts.

Merchant Shipping (Line Throwing Appliance), August 3rd; Petroleum (Amendment), August 3rd; Petroleum (Consolidation), August 3rd; Rating and Valuation, May 10th; Rating and Valuation (Apportionment), August 3rd.

(b) Private Acts.

Four Railway (Road Transport) Acts, viz.: Great Western Railway, August 3rd; London Midland and Scottish Railway, August 3rd; London and North-Eastern Railway, August 3rd; Southern Railway, August 3rd.

(2) BILLS WHICH DID NOT PASS INTO LAW.

Hours of Industrial Employment; Metropolitan Railway (Road Transport); Reservoirs (Safety Provisions); Workmen's Compensation (Amendment).

II.—PRESENT SESSION, 1928-1929.

(1) BILLS WHICH RECEIVED THE ROYAL ASSENT.

Public Acts.

Expiring Laws Continuance, December 19th; Unemployment Insurance, November 28th.

(2) BILLS PENDING.

Crown Proceedings; Local Government; Local Government (Scotland); Workmen's Compensation.

MERCHANT SHIPPING (LINE THROWING APPLIANCES) ACT.

This Act (Section 1) amends Section 427 of the Merchant Shipping Act, 1894, by extending the Board of Trade's powers to make Rules under that Section so as to include power to make Rules with respect to the number, description and mode of construction of line-throwing appliances to be carried by British ships.

An Order has been issued by the Board of Trade under the Act, dated 19th January, 1929, to come into force on the 1st July, 1929. The Order requires every ship of 500 tons gross and over when proceeding on a voyage or excursion from a port in the United Kingdom to carry the appliances prescribed by its terms.

PETROLEUM (AMENDMENT) ACT.

This Bill as originally introduced was intended to make some minor amendments in the law relating to petroleum and petroleum spirit prior to the passing of the Consolidation Act which was about to be introduced. Later, however, the Government decided to extend its scope to petrol filling stations to enable local authorities to make bye-laws to prevent injury caused to beauty spots and places of historic interest by these stations.

Clause 3 empowered the Home Secretary to make regulations as to the keeping and use of petroleum spirit by persons intending to use it for the purpose of motor vehicles, ships, boats, aircraft and engines specified in the Regulations and to exempt the users or intending users from the provisions of the Petroleum Acts as to ships carrying petroleum spirit and otherwise. (Circular 139).

It was ascertained from the Home Office that the object of referring to "ships, boats," was to extend to owners of motor boats plying in harbour the privilege of keeping a small quantity of petroleum spirit already enjoyed by the owners of motor cars under the Locomotives on Highways Act, 1896.

The Committee felt that the use of the word "ships" would give power far beyond what was required, and on being approached the Home Secretary agreed to move an amendment in Committee to substitute the words "motor boats" for "ships, boats." The amendment was carried, and is contained in Section 3 (1) of the Act. When moving it, the Home Secretary gave an undertaking that Harbour Authorities' Bye-laws with regard to the storage of petroleum spirit on their property should not be interfered with (Official Report, H. of C., 17th April, Col. 129-137).

PETROLEUM (CONSOLIDATION) ACT.

This Consolidation Measure codifies the law and repeals the four previous Petroleum Acts which between them constituted the Code, viz.:—

The Petroleum Act, 1871; The Petroleum Act, 1879; The Petroleum Act, 1926; The Petroleum (Amendment) Act, 1928.

It was thought advisable to take up with the Home Office a point upon Clause 7 re-enacting Section 4 of the Act of 1871, viz., that the operation of landing petroleum should be specifically referred as it was in the repealed section. The Home Office and the Committee which considered the Bill were, however, of the opinion that the insertion of the word "landing" was not necessary, and correspondence with the Home Office on this point is set out below.

The Association to the Home Office.

July 24th, 1928.

PETROLEUM (CONSOLIDATION) ACT, 1928.

In reply to your letter of July 19th I cannot agree with the Draftsman that Clause 7 is in correct form. Section 4 of the Petroleum Act, 1871, says that bye-laws are to be made relating to precautions to be taken on "landing" of petroleum. Section 5 of the amending Act, 1926, adds that bye-laws are to be made in respect of the loading of petroleum spirit, and it is the words of this section of 5 (1) which the draftsman has taken, overlooking the word "landing" in Section 4 of the

1871 Act. Landing should be referred to in the general part of Clause 7 (1) and one of the two principal operations should not have to be discovered in the sub-paragraph of the clause. If loading is to be mentioned in the general part of the clause, landing should be also.

As the Bill is to be taken for third reading in the House of Lords to-morrow I have sent a copy of this letter to Lord Muir-Mackenzie, who, I understand, is generally Chairman of the Committees which consider Consolidation Bills.

The clause would be put right if lines 24 and 25 read as indicated in the Association's letter of the 19th instant to Sir Malcolm Delevigne, which is as follows: "Bye-laws as to the loading and landing of petroleum spirit on or from ships and generally as to the precautions, etc."

The Home Office to the Association.

25th July, 1928.

PETROLEUM (CONSOLIDATION) BILL, 1928.

In reply to your letter of the 24th instant, the reason why the draftsman considered your amendment to Clause 7 unnecessary was that the reference to loading is required as it refers to an operation before the petroleum spirit is put on board, but the operation of landing need not be specified as it comes under the heading of conveyance on board. I explained the point to the clerk of the Committee, who spoke to me about it on behalf of the Chairman, and I gather that the Chairman is satisfied.

The Bill obtained its third reading yesterday in the Lords.

The Association to the Home Office.

August 1st, 1928.

PETROLEUM (CONSOLIDATION) BILL, 1928.

I am obliged for your letter of July 25th and for the trouble which you and the Parliamentary Draftsman have taken in considering the point the Association raised as to "landing" in Clause 7 (1).

I hope that if the question arises in the Courts, the views of the Draftsman as to the sufficiency of the bye-law power will be upheld.

RATING AND VALUATION ACT.

The main object of the Bill was to extend to manufacturers in London the advantages of the Rating and Valuation Act, 1925, with regard to the rating of machinery. It also amended in a few particulars the Act of 1925.

Clause 4 of the Bill provided that the Central Valuation Committee might obtain a decision from the High Court where, in the opinion of the Minister of Health, a substantial question of law has arisen in relation to the valuation of hereditaments.

This Clause would have enabled the Minister of Health to submit abstract questions of law for the opinion of the Judges which might have prejudiced litigants when a concrete case arose for decision. The Clause, though questioned by several Members, was passed in the House of Commons (Official Report, H. of C., 19th March, 1928), but it is satisfactory to note that it was withdrawn by the Lord Chancellor owing to the opposition of the Law Lords (Official Reports, H. of L., second reading, 27th March, 1928, Cols. 607-640; Committee Stage, 24th April, 1928, Cols. 793-804; third reading, 1st May, 1928, Cols. 913-915). (Circular 139).

RELIEF OF INDUSTRY FROM THE BURDEN OF RATES.

The Chancellor of the Exchequer (Mr. Churchill) in his speech on the 24th April, 1928, introducing the Budget for the year, gave in outline the Government's scheme for the relief of industry from the burden of rates. (Official Report, H. of C., 24th April, 1928, Cols. 823 to 874).

The following are extracts from the speech:—

"The Policy will proceed in three main stages. First the gathering of the money necessary for the relief of the rates upon the producers; secondly, the defining of the scope and direction in which that relief should be applied; and, thirdly, the reimbursement of the local authorities for their loss in rateable value." (Col. 849).

Mr. Churchill then describes the method of granting and the properties to receive rate relief:—

"So far we have been journeying in the wilderness of preparation. We now begin to reach the fertile and agreeable regions of rating relief. I am speaking, of course, not of the general reduction of rates which we believe will follow the main Local Government Bill of my right hon. friend in the winter in consequence of this new system, but I am speaking of the special relief which is to be given to the producer, manufacturing and agricultural. I have said we shall concentrate our relief on the producer. These reliefs will be afforded in two ways. They will be afforded directly by reduction of rates upon premises used for the purposes of production. The relief will be afforded indirectly by the reduction of the rate burden upon the freight carrying railways, the canals, harbours and docks. In the latter case, however, the case of the railways, etc., the relief will only be afforded conditionally on those undertakings making equivalent reductions in their transport charges wherever practicable." (Cols. 863-4).

"The properties which are to receive de-rating relief comprise every form of productive industry from the heaviest basic to the most complex and highly-finished forms, from the most prosperous to the most suffering, and, in addition, they comprise the freight-carrying railways, the canals, the harbours and docks. In the aggregate, these undertakings provide the means of livelihood for about 10,000,000 wage-earners. Over the whole of this area it is proposed at the rate payment of October, 1929, to reduce the local rates by three-quarters. The remaining quarter is left, not in derogation of the principle which we affirm that the tolls and plants of production ought not to be subject to taxation, but only the profits arising from their use—the remaining quarter is left in recognition of the importance of preserving some connection between local industry and local fortunes in order that both the local authority and local manufacturers may have some interest in common and take an interest in each other's welfare." (Cols. 864-5).

He further stated that the Government's object was to impart a real stimulus to the basic industries and to production generally. That for railways the benefit were to be concentrated upon agricultural and the following heavy traffics: Coal, coke and patent fuel, mining, timber, iron stone, iron ore and manganese ore, and limestone for blast furnaces and steel works.

Later he refers to the rating relief to be granted to docks as follows:—

"As to the canals and docks for various reasons of detail with which I will not weary the Committee to-night, no special machinery is proposed to ensure the passing on of the reliefs. The canals practically follow the railway traffic, and most of the docks and harbours are either on a non-profit basis or under control of interests which are concerned in keeping the charges as low as possible." (Col. 868).

The "Three Main Stages" spoken of by the Chancellor of the Exchequer were as follows:—

FIRST STAGE.

THE FINANCE ACT, 1928.

By this an extra tax was placed on petrol to find the money required to recoup the local authorities for the money they would lose by reason of the de-rating proposals.

SECOND STAGE.

RATING AND VALUATION (APPORTIONMENT) ACT, 1928.

The Bill, which was introduced into the House of Commons at the end of May and received the Royal Assent on the 3rd August, specifies the hereditaments which are to be subject to rating relief, viz.:—

Agricultural Hereditaments; Industrial Hereditaments; Freight Hereditaments.

"Freight Transport Hereditaments" (Section 5) include railways, docks and canals.

With a view to simplification in the definitions relating to Freight Transport Hereditaments a number of amendments on behalf of the Association were set down to the Bill and the officers were in touch both by interviews and letters with the Ministries of Health and Transport.

As a result there are now (Section 5) definitions of "dock authority" and "dock undertaking" and the meanings of the expressions "freight transport hereditaments," "canal transport purposes" and "dock purposes" have been altered to make it clear what properties are to be relieved of rates.

Again, proviso (a) to Section 6 (3) was inserted to put beyond doubt that premises forming part of a dock, railway or canal undertaking, although let out are entitled to be de-rated if they are "occupied and used for transport purposes."

Other amendments which your Committee put forward to the Government, such as relief for Head Offices and Warehouses could not be obtained. (Circular 143).

The limit date for the submission of claims in respect of property to benefit by de-rating was 16th October, 1928, for Industrial claims, and 1st February, 1929, for Freight Transport claims. The Association's Rating and Valuation Subcommittee gave advice to the members with regard to the forms and nature of the claims to be made to the local rating authorities and on other matters. (Circulars 147 and 150).

The thanks of the Association are due, amongst others, to Mr. Walter Runciman, the Chairman of the Shipowners' Parliamentary Committee, Mr. E. Brown, Sir W. Greaves-Lord, Miss Susan Lawrence, Mr. Gates and Mr. Rye for putting the views of Dock and Harbour Authorities before the House of Commons and the Ministers.

THIRD STAGE.

LOCAL GOVERNMENT BILL: LOCAL GOVERNMENT (SCOTLAND) BILL.

These Bills were introduced early in November, and in moving the second reading of the First Bill on the 26th November, the Minister of Health (Mr. Neville Chamberlain) (Official Report, H. of C., Col. 66) said: "I often hear this Bill described as a de-rating Bill, and of course it is true that it contains the final and completing stage of that great measure of rating reform, the earlier stages of which we have already discussed in the Finance Bill and in the Rating and Valuation (Apportionment) Act of last Session. . . ."

The Bill also (Parts I to IV and Part VII) (the references are to print No. 3), proposes to transfer the responsibility for Poor Law Administration to Counties and County Boroughs as a necessary accompaniment of the scheme of rating reform. It is also proposed to transfer to County Councils all highway powers of Rural District Councils and all classified roads in Urban Districts and non-County Boroughs (Part III).

The de-rating parts of the Bills which principally concern Public Undertakings are Part V, Clauses 54 to 67, of the English Bill, and Part II, Clauses 30 to 36, of the Bill for Scotland, while Clause 113 and the 11th Schedule of the English Bill extends to Great Britain as a whole. This latter Clause and Schedule relate to the transmission of the benefit of rate relief in respect of freight transport hereditaments.

Railways will, as already stated, be under a statutory obligation to pass on de-rating benefits to the specified traffics. These are set out in the 11th Schedule to the Bill under three main headings, viz. :—

Part II.—“Agricultural Selected Traffics,” which include manure, lime, cattle feeding stuffs, potatoes, milk, etc.

Part III.—“Coal, Coke and Patent Fuel Selected Traffics”; and

Part IV.—“Other Selected Traffics,” including timber, iron or steel for mines, ores, lime or limestone in bulk, etc.

Other bodies are under no statutory obligation to pass on the benefit, but on this subject as well as the Chancellor of the Exchequer's reference (Official Report, H. of C., 24th April, 1928, Col. 868) to the constitution of the Dock and Harbour Authorities who work “on a non-profit basis or under control of interests which are concerned in keeping the charges as low as possible” and the following recital from Clause 113 (1) of the English Bill should be noted, viz. :—

“It is intended that occupiers of freight transport hereditaments, lands and heritages should allow rebates from or make reductions in the charges made by them in connection with the uses of such hereditaments, lands and heritages for transport purposes, corresponding to the relief from rates due to the operation of Part V of this Act and of any corresponding enactment extending to Scotland.”

Paragraph (b) of Sub-clause (1) gives the Minister of Transport power over the disposal of “Rebates” and “Reductions” where he already has the power of revision.

With regard to the Bills generally the Association has been in touch with the Ministries of Health and Transport and with the Secretary of State for Scotland on several questions raised by the Associations' Rating Sub-Committee, and the Bills will be followed in all their steps.

ADVANCEMENT OF DE-RATING FOR RAILWAY-BORNE TRAFFIC.

Under the above Acts and Bills the de-rating scheme and the benefits therefrom were to commence on the 1st October, 1929, but during the summer the Government were approached by the trades to be benefited by the reduction in railway charges who asked that the date for railway-borne traffic should be advanced.

The Prime Minister, when speaking on the Unemployment Motion brought in by the Labour Party (Official Report, H. of C., 24th July, Col. 1139), promised, on behalf of the Government, to consider the advancement of the date of de-rating for railway-borne traffic. He then said:

“In connection with the question of freight relief, we have also considered whether it will be possible to expedite its operation in any measure. . . . The proposal is deserving of the most serious examination. Our adoption of the proposal must be contingent on our being satisfied that the Railway Companies themselves are making a genuine effort to support economies. . . . Subject to what I have said, and contingent upon it, we shall ask Parliament, when we meet in the autumn, to make the necessary provision for bringing into force these freight reductions in advance of the general de-rating scheme, and making them operate from 1st December of this year, instead of 1st October, 1929. We shall, of course, so frame our interim proposals that they will merge in the most convenient way into the rest of the scheme on the 1st October following.”

As a result, in order to anticipate the date of de-rating, a scheme in anticipation of statutory relief, dated 14th November, 1928 (Cmd. 3215) was presented by the Minister of Transport when Parliament re-assembled in November, and the necessary Supplementary estimate was passed.

The scheme, which covers Railway Companies and Light Railway Companies, shortly, provides for the establishment of a fund to be called the Railway Freight Rebates (Anticipation) Fund, to be administered by the Railway Clearing House. The sum to be provided by the Government for the interim period from 1st December, 1928, to 30th September, 1929, is £3,333,333, which will be paid to the Companies in proportion to the rebates allowed by them in the selected traffic specified in the scheme. Various agricultural products, including cattle, feeding stuffs, potatoes and milk, are to be relieved to the extent of 10 per cent. of the carriage charges. Coal, 25 to 30 per cent. Timber for mines, ores, lime, etc., 10 per cent.

The Coasting Trade, which is in close competition with railway-borne traffic, is seriously affected by these advanced reductions,

especially in the case of certain agricultural produce. (Circular No. 157).

Representations were at an early stage made to the Government Departments concerned, both by the Chamber of Shipping and the Association pointing out the injury that would be done to other forms of transport and particularly to the Coasting Trade if the advancement in date was to apply only to railway-borne traffic, and when it was found that it was the Government's intention to advance the date for de-rating for railway-borne traffic alone, strong protests were sent in not only to the Ministries in charge of the Bills and scheme, but also to the President of the Board of Trade as head of the Department interested in shipping.

In spite of these representations, which are being renewed at the present time, the Government have so far refused to extend the same treatment to other forms of transport.

RAILWAY COMPANIES (ROAD TRANSPORT) ACTS.

Seven Bills were promoted by the following Railway Companies, viz. :—

Great Western Railway; London Midland and Scottish Railway (2); London and North Eastern Railway (2); Southern Railway; and the Metropolitan Railway.

The object was to obtain extensive powers to provide, own, work and use road vehicles and to enter into working agreements with any local authorities, company or person for this purpose.

The Bills were considered by a Joint Committee of both Houses presided over by Viscount Chelmsford. On the 28th June, the 34th day of hearing, the Committee gave their decision, finding the Preambles of six of the Bills (two Scottish) proved, subject to certain conditions mentioned below, the seventh, that of the Metropolitan Railway Company, was rejected.

The Joint Committee at the same time recommended that the Minister of Transport should promote a Public Bill governing the Conditions under which traffic should be carried on throughout the country, and to bring the power of the Licensing Authorities into conformity with modern traffic requirements, and to give power to impose conditions as to fares and to take into account the adequacy of existing services and congestion of streets and roads.

After three further days' hearing on clauses the Committee Stage was concluded on the 4th July.

The Association did not petition against the Bills, but from time to time they made representations to the Minister of Transport and the Railway Companies, several of which have been given effect to in the Acts. (Circulars 139 and 143).

There are now four Acts of Parliament, one for each of the Amalgamated Railway Companies, as the Scottish Bills for the London Midland and Scottish and the London and North-Eastern Railways have been incorporated into the general Road Transport Acts of those Companies.

The four Bills received the Royal Assent on 3rd August.

The main safeguards to protect trading interests, including those of Dock and Harbour Authorities now contained in the Acts, are as follows:—

Section 2. “Representative Body of Traders.”—This term has been defined to include the authorities and bodies mentioned in paragraphs (a) and (b) of Sub-section (1) of Section 76 of the Railways Act, 1921.

This definition brings in Harbour and Conservancy Authorities, who will thus be entitled to object to the withdrawal of services of road vehicles under Section 6 (a) of the Act and to apply to the Railway Rates Tribunal Section 9 (3) if they consider that the fares, rates and charges to be recorded under Section 8 are unreasonable.

Section 11. Working Agreements, etc.—The main alterations made in this section (Clause 6) is the introduction of a proviso that agreements with local authorities may only cover the running of road vehicles upon routes along which the local authority already has power to run omnibuses and must be subject to any statutory restrictions imposed on the local authority in respect of the exercise of such powers.

Further, after making any agreement, notice must be given to the Minister specifying the names of the parties and whether the agreement is one whereby the business of any company or person is controlled by the railway company through shareholding, nomination of directors, or as a result of any financial transaction.

Section 13. Provision in case of exercise of powers of Act being in opinion of Minister against public interest.—This new section contains the next safeguard of importance as it provides that if in the Minister's opinion the interests of the public are prejudicially affected by the exercise of the powers of the Act he may direct that a public inquiry be held at which all parties whom he considers entitled to be heard shall be given that opportunity.

Section 14. Accounts and Statistics.—This section (Clause 8 in the Bill) has been altered mainly to ensure that a statement of account shall be furnished annually to the Minister of the net revenue resulting from and the capital employed in the company's road transport business.

The amendments made on the final stages were of minor importance.

HARBOUR, DOCKS AND PIERS (TEMPORARY INCREASE OF CHARGES) ACTS, 1920 TO 1922.

By the Expiring Laws Continuance Act, 1928, which received the Royal Assent on 19th December, these Acts are to be continued for three years, viz., until the 31st December, 1931.

The Select Committee on the Expiring Laws Continuance Act issued their Report in September (No. 101 of 1928) and recommended (inter alia) that the above Acts should be continued for a period of three years and should be replaced as soon as possible by permanent legislation in order to relieve harbour undertakings from their present position of uncertainty. (Circulars 146 and 160).

DOCK POLICE—EXCHEQUER GRANT.

Having regard to the extensive alterations in connection with Local Government foreshadowed by the Budget speeches and the subsequent Local Government Bills, it was felt desirable that this question should again be brought to the notice of the Government (Report for 1920, p. 8). (Circular 143).

The following letter was therefore written to the Chancellor of the Exchequer, enclosing a print of the Association's Memorial dated December, 1920.

July 26th, 1928.

Sir,

Rating and Valuation (Apportionment) Bill.

Grants to Authorities in Aid of Rates—Police Expenses.

This Association has read with considerable pleasure the announcement you made on behalf of the Government when introducing the Budget to the House of Commons on the 24th April last, also your subsequent speeches and those of other Ministers in connection with the Budget and on the Second Reading Debate on the Rating and Valuation (Apportionment) Bill. From these authoritative statements it is clear that it is the intention of the Government to grant substantial relief to Dock and Harbour Authorities with a view to their using these benefits in the interests of the trade of the country.

The Dock Undertakings in many cases cover very extensive areas, to which the public have access at all reasonable times, and the Dock Authorities are responsible for public services within the areas administered by them.

One of the heaviest expenses of a public character incurred by the Authorities at the present time is the cost of policing their undertakings, and in respect of this they do not receive any grant in aid from the Exchequer such as is conceded towards the cost of the general Police Forces of the Kingdom.

The Association presented a Memorial to the then Chancellor of the Exchequer and the Secretary of State for Home Affairs in December, 1920, asking that the Police employed at the Docks and Harbours should be placed in the same position as regards an Exchequer Grant as the other Police Forces in the country. The prayer of the Memorial, of which I enclose a print, was at that time rejected, but to-day appears to be an opportune time, in the light of the desire of the Government to assist trade and commerce, to renew the application with a view to its consideration before the introduction of the Government measure in the Autumn Session. We are the more encouraged to bring the matter forward again because of the anxiety you expressed in your address at Hale Park (*Times*, June 25th, 1928) as to whether the Government proposals would prove to be sufficient.

The services rendered by the police at ports are of a public character and include, amongst other duties, assisting alien officers, customs and excise officers and emigrants, and the policing of numerous trading undertakings situate on the dock estates. Without efficient police on these estates the City and Borough police in the various districts would have to be increased.

The Government has recognised the need of granting some measure of relief in respect of the burden of local taxation upon Dock Undertakings. In view of the heavy expense of policing docks and harbours, which has seriously increased since the war, this Association asks that the application for a grant such as is made to County and Borough Councils may be sympathetically considered in connection with the relief which the Government intends to give to Dock Undertakings.

I am, Sir,

Your obedient Servant,

(Sgd.) W. C. THORNE.

The Rt. Hon. The Chancellor of the Exchequer,

The Treasury,

Whitehall, S.W.1.

Copies of the letter were sent to the Ministry of Transport, the Home Office, and to the Secretary of State for Scotland, but so far no reply has been received from the Government.

The Scottish Members of the Association have also taken up the question with the Secretary of State for Scotland.

FACTORIES (No. 2) BILL, 1926.

Further meetings of the Conference at the Home Office (page 11 of Report for 1927) were held in January, 1928, attended by the Association's officers. In all, 20 meetings were held in the autumn and winter of 1927-28.

The Government have not introduced a Factories Bill during the past or present Session. The Prime Minister, in announcing this decision in February, 1928 (Official Report, H. of C.,

7th February, Col. 36), expressed the hope that the Bill might be proceeded with in the Autumn Session.

At the opening of the November Session the Chancellor of the Exchequer spoke as follows (Official Report, H. of C., 8th November, Cols. 265 and 266):—

"I turn aside now to deal with a point to which the Rt. Hon. Gentleman (Mr. Clynes) referred at some length—the failure of the Government to fulfil pledges in regard to the Factories Bill. We have not included that Bill in the work of this Session. You have invited us to the great assize of the Nation. We accept your invitation, and we shall appeal to the country at the first moment after our De-rating Bills have been passed and the necessary financial business settled.

"How then is there time for a Factories Bill as well as the De-rating Bills? Parliament will have to sit very long and almost continuously. We have to choose between the de-rating measures, which is our main contribution to trade revival, and unemployment, and this desirable Factory legislation. Can anyone doubt that it would be wrong to delay a General Election for the sake of the Factories Bill, or to give a Factories Bill at this time priority over de-rating legislation? When de-rating has brought its relief to industry, which is now so heavily burdened, the Factories Bill will follow naturally. I think that that is so. On the whole, the conditions in the factories of this Island are better than those which prevail on the Continent of Europe. But you cannot say that British industries are in a more favourable position than the industries on the Continent. I am sure that with trade and unemployment in the position in which they are, it is absolutely necessary that a measure of relief should precede and not follow regulations, however desirable."

KING'S BIRTHDAY.

It is satisfactory to note that again in 1928 a Saturday (9th June) was fixed as the official holiday for Customs and Excise Officers.

NATIONAL CONFEDERATION OF EMPLOYERS' ORGANISATIONS.

The Association have again contributed 50 guineas towards the expenses of the Confederation, having regard to their help in respect of the International Labour Conference at Geneva, Factory and other matters.

The Hon. Secretary represents the Association on several of the Confederation's Committees.

TONNAGE MEASUREMENT OF OIL TANK STEAMERS. COFFERDAM SPACES—WATER BALLAST SPACES.

In the Report for 1927 (page 11) the deduction of these spaces from the gross tonnage is referred to, and the three following cases have been brought under notice during the year (Circular 143):—

1. S.S. "Queen Maeve."—This vessel on a voyage from New York in November, 1927, carried about 50 tons of bunker oil in her cofferdams. The matter was reported to the Board of Trade and the vessel was re-measured and the deduction in respect of her No. 2 cofferdam disallowed, which has resulted in an increase of her net register tonnage upon which dues are paid of 158 tons, viz., from 2,478 to 2,636 tons.

2. S.S. "British Fusilier."—The point with regard to this vessel is whether certain spaces allowed as deductions are "adapted only" for water ballast (Sec. 79, Merchant Shipping Act, 1894, coupled with Sec. 54 of the Merchant Shipping Act, 1906). So far the Board of Trade have not accepted the Association's view and state that deductions for these spaces are correct. The following letter of the 21st March, 1928, put the Association's case clearly, and the matter will be taken up again as opportunity offers.

The Association to Bd. of Trade, Mercantile Marine Dept.
March 21st, 1928.

S.S. "British Fusilier."

I am obliged for your letter of March 9th, and I am glad to know that the Board of Trade agree that Ships' Surveyors' discretion as to the deduction to be allowed is confined to consideration of cases where the space is "adapted only for water ballast."

I take it, however, that the Board of Trade in the case of the s.s. "British Fusilier," now under consideration, are of opinion that the space which the Surveyors allotted for deduction is adapted only for water ballast, and therefore deductions can be allowed. In my letter of February 23rd I traversed this view and refer you to my previous correspondence, in which—particularly in my letter of November 3rd—I gave reasons why the spaces deducted were not adapted only for water ballast. It was because the Board of Trade do not accept my Committee's view that I suggested the correspondence should be submitted to the Law Officers of the Crown.

It is clear from the ship's certificate that the Surveyor himself was in doubt, because he set out the cofferdam space as a deduction separate from water ballast space, though now the deduction is justified on the ground that it is a space adapted only for water ballast, whereas in the view of the Association, to put it as high as possible in favour of the ship, it is at most a space which can be used for water ballast.

As stated in my letter of the 20th January, 1927, according to the ship's plan on board the vessel the cofferdams are not

included in the "Total Water Ballast" Tonnage of 1,132 tons (weight) which indicates that the owners themselves did not contemplate the use of these spaces for water ballast.

The particulars given on the ship's plan are in the following form:—

Extract from Ship's Plan:—

				Tons.
"Water Ballast."				
"Compartment."				
"After Peak"	...	...	...	230
"Feed Water Tank"	...	...	...	61
"Deep Tank Ford"	...	...	...	709
"Fore Peak"	...	...	...	132

Total Water Ballast	...	...	...	1,132
"Aft Cofferdam"	...	...	...	187
"Fore Cofferdam"	...	...	...	190
"Three F.W. Tanks"	...	...	...	40
"One ditto"	...	...	...	9
"Three ditto"	...	...	...	4

In support of the statement that these spaces are not adapted only for water ballast the s.s. "Queen Maev" (Official No. 80773) had about 50 tons of her bunker oil in her cofferdams when she reported at Liverpool from New York on the 5th November, 1927.

I shall be glad to hear that having regard to the information set out above you are now prepared to instruct the Surveyor to include these spaces in the vessel's net tonnage.

3. S.S. "Aztec."—The question of the re-measurement of this Norwegian tank vessel, which is of similar build to the "Inver" class of steamers with cylindrical tanks (Report for 1925, pp. 21-22) was raised in 1927, as her register showed abnormal deductions for water ballast space.

In January of 1928 the Board of Trade informed the Association that the vessel had been re-measured and a new tonnage certificate issued in which no deduction is made for the side tanks, materially increasing her net register tonnage on which dues are paid, viz.:—

GROSS TONNAGE.		NET TONNAGE.			
	Tons.	Original.	Addition on	Present.	
		Tons.	remeasurement.	Tons.	
"Aztec"	5,665	2,526	+ 941	3,467	

POLLUTION OF RIVERS.

Sir Ion Hamilton Benn, Chairman of the Rivers Committee of the Port of London Authority, gave evidence on behalf of that Authority, and the Hon. Secretary, on behalf of the Association, before the Ministry of Health Advisory Committee on River Pollution on 7th June, 1928. The Hon. Secretary's evidence was mainly directed to the point that although river pollution was not the principal business of Dock and Harbour Authorities, yet if it was decided that it was necessary for Boards to be set up for the tidal parts or lower estuaries of rivers they—the Harbour Authorities—should, following the Port of London Authority and Thames Conservancy precedent, have these pollution powers.

A note of the Hon. Secretary's evidence and the Committee's official précis were sent to the members at the time (Circulars 138 and 143).

The Advisory Committee issued their first Report, dated 10th July, 1928, and attention is drawn to para. 12, which is as follows:—

"12. Most of our witnesses are agreed that in order to secure the proper administration of the Rivers Pollution Prevention Acts there should be an authority exercising jurisdiction over the river as a whole, including its tributaries, at least so far as non-tidal waters are concerned, and your Committee are strongly of that opinion. We therefore recommend that steps should at once be taken in that direction."

RAILWAYS ACT, 1921.

STANDARD CHARGES—OTHER SOURCES OF REVENUE—DOCKS, HARBOURS AND WHARVES.

In compliance with the undertaking given by the Railway Companies in the agreement dated 12th October, 1927 (Report for 1927, pp. 13-15) plans of the principal Railway Dock Undertakings have been submitted by the Companies and a meeting was held in July last when a number of points arising on the plans and as to the keeping of the Accounts were cleared up. A few points, however, still await settlement and the matter is being attended to (Circulars 139 and 143).

INTERNATIONAL LABOUR CONFERENCE, GENEVA, 1928.

PREVENTION OF INDUSTRIAL ACCIDENTS—LOADING AND UNLOADING SHIPS.

The Danish and Swedish Governments pointed out to the British Government in the autumn of 1927, regarding the application to Scandinavian ships in British ports of the Dock Regulations in force in this country, that under a Convention between the Scandinavian countries they recognise the sufficiency of each other's regulations in regard to the construction and equipment of ships, and they asked if the Government were prepared to agree to a similar arrangement.

Although not prepared to accept the various Scandinavian Regulations in force in those countries, the Government suggested that the matter should be considered by the International

Labour Conference to ascertain whether it was desirable and practicable for Maritime Countries to come to an agreement as to the measures necessary for the protection of persons engaged in the loading and unloading of ships so far as they relate to the construction of and plant used on ships and the records to be kept and other matters to be observed on board.

When this question was received by the International Bureau it was elaborated so as to include the whole scope of Dock Regulations in force in the various countries, and the subject was set down for consideration at the Geneva Conference of May-June, 1928, and a bulky "Grey Book" was issued.

Having regard to the importance of the question it was arranged, through the National Confederation of Employers' Organisations, that Mr. C. M. Jenkin Jones, who is in charge of the Docks owned by the London and North-Eastern Railway Company, should represent the Association and the Railway Companies owning Docks as Technical Adviser to the British Employers' Delegation, Mr. Cuthbert Laws of the Shipping Federation being the other Technical Adviser on this subject.

The 1928 International Conference decided to circulate Questionnaires on the subjects, viz., Prevention of Industrial Accidents and Protection of Workers engaged in Loading and Unloading Ships, to the Governments for their observations, and the replies will be considered at the Conference in 1929. It is understood that the British Government's reply on the latter subject reverts to their original proposition, namely, that the Conference should confine itself to the consideration of measures necessary for the protection of persons so far as they relate to work on board ships. For further information relating to the 1928 Conference, members are referred to Mr. Jenkin Jones' Report circulated as an Appendix to the Progress Report (Circular 143).

The Transport and General Workers' Union had prior to the Conference forwarded to the Association a draft Code of International Regulations for the protection of persons employed in loading and unloading ships which they proposed to bring forward, and they asked the Association to support.

The draft Code, although purporting to be based on the Dock Regulations of 1925, was found to differ from them in many important respects, and the following gives the substance of the Association's reply to the Transport Union dated the 16th May, 1928.

"The draft print of the proposed International Regulations differs in so many respects from the Regulations in force in this country under the Home Office Order of 6th March, 1925, that the Association cannot support the proposals. So far as they embody the result of the careful deliberation bestowed on the subject at the Home Office Conference in 1924-25 they should meet with the support of reasonable people, but it cannot be ascertained that there is any necessity for extending the scope of the Regulations which were settled in the light of the experience of the representatives of the various interests concerned in the loading and unloading of ships and the handling of goods on wharves and quays.

"The Association has no detailed knowledge of the position of foreign ships or of the circumstances at foreign ports, and it may well be that regulations which are workable in this country would not be fitted to conditions elsewhere, and vice versa. Further, though it is desirable to work in concert with other nations and industries where practicable it requires considerable deliberation before any decision could be arrived at to embody a code of working rules in an International Convention. At the present time by the procedure under the Factories Acts the Regulations can be reviewed and alterations made from time to time to adjust the Regulations to meet points which were not present to the mind when they were settled. If once the Regulations were embodied in an International Convention this desirable elasticity would be largely lost, as it would be impracticable to call the nations together to remedy some small point which might work harshly or require adjusting in any particular country." The Draft Regulations were not considered last year, but they may be brought up again at the 1929 Conference.

CHARGES AT PORTS FOR AIRCRAFT.

The question of obtaining power to charge aircraft, and their passengers and merchandise at Ports has been considered by the Executive Committee, and they have advised members when applying to Parliament to consider the desirability of obtaining specific powers to make these charges. A statement was issued giving the recent precedents in Dock Acts for such charges (Circular 152).

DOCKS AND HARBOURS DUES, ETC., ARRANGEMENT WITH GOVERNMENT (DECEMBER, 1920).

POST OFFICE STORES CARRIED ON FERRIES.

The Post Office in Scotland questioned whether this arrangement applied to Post Office vehicles and goods carried on the Tay Ferries of the Dundee Harbour Trust. In the result it has been arranged that the Postmaster-General agreed to pay 75 per cent. of the ordinary rates for the conveyance of motor

(Continued overleaf).

MARCONI BEACON STATION



MARCONI beacon apparatus has been installed at Start Point Lighthouse for the Corporation of Trinity House.

THIS installation has a power of 500 watts and is operated on a wavelength of 1,000 metres, with the call sign GSM. The whole equipment is automatically controlled by a master clock for transmitting groups of interrupted continuous wave signals at pre-arranged intervals.

The completion of the Start Point transmitter means that cross-bearings can now be taken by ships fitted with wireless direction finders using

the stations at Round Island, Casquets and Start Point as their fixed points. A sequence of bearings can be obtained, whenever required, by navigators who can be sure of their position, right up the Channel, in any weather.

Accurate direction finding bearings may be expected up to about 100 nautical miles, under normal atmospheric conditions, from these particular beacons.

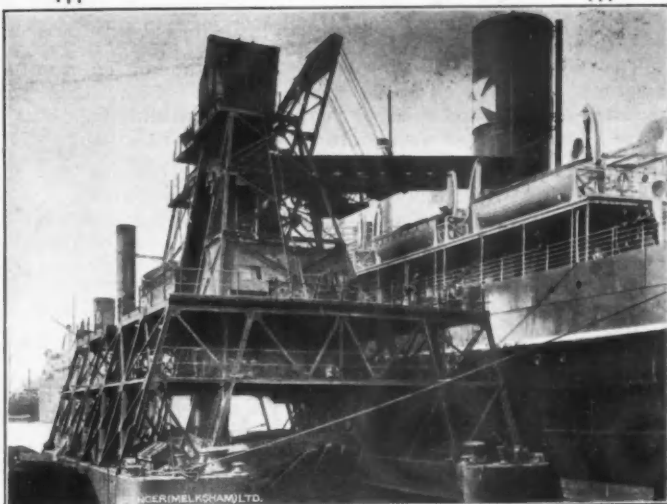
Start Point is the seventh Marconi Beacon installation to be installed round the British coasts. Six more are to be installed in the near future, and similar stations have been ordered for other countries.

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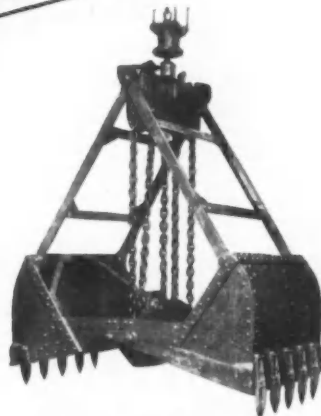
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WATER TRANSPORT PREMIUMS.

PREMIUM FOR 1928.

The subject for the 1928 paper (page 21 of the Report for 1927) was:—

"Reasons for and against the combination of a Conservancy, Dock-owning and Dock-working in a single Authority."

The adjudicators appointed by the Institute of Transport awarded the prize, a gold medal, to Mr. W. A. Flère, a member of the staff of the Port of London Authority. Mr. Flère's paper is published in the Journal of the Institute of Transport for November, 1928 (Circular 153).

PREMIUM FOR 1929.

The Institute of Transport have appointed the same three adjudicators, viz., Messrs. Ross-Johnson, Latimer and Watkins for this year, and the subject they have selected for the coming competition is as follows:—

"A description of the varying policies in force with different Port Authorities in regard to the provision of labour for handling cargo, e.g.:—

- When the Authority has the monopoly of the labour supply;
- When it is prepared to supply the labour in competition with private enterprise;
- Where it remains entirely aloof from the labourage operations."

(Circular 154).

BRITISH ENGINEERING STANDARDS ASSOCIATION.

SUB-COMMITTEE 21/1—SHIP'S CARGO LIFTING GEAR.

Captain L. M. Davies, Wharf Superintendent, White Star Line, Liverpool, is representing the Association on the Sub-Committee which the Standards Association have recently set up to consider the question of lifting gear for ship's cargo.

PORT CHARGES.

NORTHERN EUROPEAN PORTS.

Bearing on the subject of Charges and the competition for trade between British and Continental Ports (Reports for 1925, pp. 8 to 10, and 1926, pp. 15-16) an interesting series of articles on the Ports of Antwerp, Rotterdam, Hamburg and Bremen from their "Shipping Correspondent" appeared in the Times of November 1st, 2nd and 3rd, 1928, with a leading article on the 3rd, followed by a letter from Lord Inchcape on the 8th November.

MISCELLANEOUS.

Among other matters which have received attention during the year are:—

Department of Scientific and Industrial Research.—"Causes of Failure of Wrought Iron Chains" (Circular 141).

National Health and Pensions Insurance.—Extension of Compulsory Insurance to certain Independent Contractors (Circular 159).

Merchandise Marks Act, 1926.—Applications to Mark Imported Goods.

Model Code of Harbour Bye-Laws.—Petroleum Spirit.

Netherlands Industrial Exhibition.

Washington Convention.—Eight-hours' day.

Draft Shipbuilding Regulations.—Lighting of Graving Docks.

Lighting of Coasts.—Signals at the approach to a Harbour.

Borrowing Powers of Harbour Undertakings.

Docks, Terms of User.—Harbours, Docks and Piers Clauses Act, 1847, Section 33.

Through Traffic between Great Britain, the Irish Free state and Northern Ireland.

Pilferage at Docks.

Royal Commission on Transport.

Widows, Orphans and Old Age Contributory Pensions Act, 1925.

Immunity of Public Ships Convention, 1914.—Crown Proceedings Committee Report.

Oil in Navigable Waters:—

- Vessels to which Act of 1922 applies.
- Discharge of Oil to Assist Navigation.
- Fire at Constanza.

Factory Acts.—Factory Inspectorate.—Departmental Committee.

International Maritime Conventions.—Limitation of Liability.—Mortgages and Liens.

PRINCIPAL CIRCULARS ISSUED IN 1928.

Bills in Parliament—Session 1927 (No. 133).

Railway Companies (Road Transport) Bills and Scottish Orders, 1928 (No. 135).

Pollution of Rivers (No. 138).

Interim or Progress Reports, May and August (Nos. 139 and 143).

Rating and Valuation (Apportionment) Bill (No. 140).

Rating and Valuation (Apportionment) Act, 1928.

Grants in Aid of Rates—Police Expenses (No. 144).

Rating and Valuation (Apportionment) Act, 1928 (Nos. 145, 147, 148, 148(a) and 150).

Expiring Laws Continuance Act, 1928, Harbours, Docks and Piers (Temporary Increase of Charges) Act, 1920 (Nos. 146 and 160).

Local Government Bills—Government's De-rating Scheme (Nos. 151, 156 and 157).

Charges at Ports for Aircraft (No. 152).

Water Transport Premium (Nos. 153 and 154).

ASSOCIATION'S INCOME TAX.

The Inspector of Taxes wrote on the 3rd April last that there was no liability to Income Tax for the year 1928-1929.

ACCOUNTS.

The expenditure for the year amounts to £2,061 8s. 1d., of which £2,040 18s. 0d. is payable by members of the Association.

The special expenditure incurred on appeal to the Court of Appeal and in proceedings before the Railway Rates Tribunal has amounted to £2,978 6s. 5d., which, allowing for the £1,750 charged (£1,000) to the 1926 and (£750) to the 1927 accounts, leaves £1,228 6s. 5d. outstanding. Of this latter amount a further sum of £250 has been debited to this year's accounts, leaving a balance of £978 6s. 5d. to be met in future years.

During the year £875, or the half of the loan, was repaid to the Authorities, who so kindly advanced £1,750 to meet the special Railway Expenses (p. 26, Report for 1926).

The Committee do not recommend any levy for 1928, and as will be seen a debit balance of £71 19s. 1d. will be carried forward to 1929.

SUBSCRIPTIONS: IRISH FREE STATE.

The Committee decided, under the power given to them by Rule 12 (2) of the Constitution and Rules, to fix the subscriptions for the Irish Free State Members of the Association for 1929 and onwards as follows:—Dublin, £50; Cork, £25; Limerick (minimum), £5 5s.

HARBOUR, PILOTAGE AND CONSERVANCY AUTHORITIES.

The Committee fixed the subscriptions of these Authorities under Rule 12 (4) for 1929 on a gross income basis without liability to a levy.

RATE OF EXCHANGE FOR PORT DUES IN YUGOSLAVIA.

The Department of Overseas Trade has received from the Commercial Secretary at Belgrade the following list of official rates of exchange for the payment of port dues in Yugoslavia during the month of February, 1929, which have appeared in the "Official Gazette":—

	Dinars.
1 Gold Napoleon	218.60
1 Pound Sterling	276.30
1 American dollar	56.85
1 Canadian dollar	56.55
1 German mark, gold	13.54
1 Belga	7.91
100 French francs	222.60
100 Italian lira	298.00
100 Dutch florins	2,284.00
100 Roumanian leis	34.20
100 Danish crowns	1,516.00
100 Swedish crowns	1,520.00
100 Norwegian crowns	1,515.00
100 Pesetas	980.00
100 Greek drachmas	73.60

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

KIEL CANAL TRAFFIC DURING 1928.

A report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg states that the volume of traffic through the Kiel Canal during 1928 is regarded as satisfactory, 54,102 vessels aggregating net reg. tons of 20,808,311 making the transit, as against 53,422 vessels of 20,880,625 net reg. tons in 1927. Of the 54,102 vessels 27,171 were registered as steamers and motor vessels with an aggregate tonnage of 18,533,310 net reg. tons, 24,239 of a total net reg. tons of 1,164,051 as sailing vessels, and 2,253 of a total net reg. tons of 560,114 as lighters and barges. The vessels were loaded as follows:—

394 with passengers; 2,072 with coal; 1,186 with stone; 619 with iron; 4,746 with timber; 7,848 with grain; 282 with cattle; 7,843 with ores and other goods in bulk; 1,106 with mixed cargo; 12,415 with piece goods; 15,369 empty or in ballast.

Compared with 1913 in which 53,282 vessels aggregating 10,348,929 net reg. tons passed through the canal, the traffic shows an increase of 100 per cent. in tonnage, while the average size of the vessels using the canal has doubled. The receipts of the canal have not increased in proportion to the volume of traffic, and the total earnings are now only sufficient to cover the bare cost of upkeep.

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.